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The Indian Middle Stone Age: Some New Sites in Central and Southern India, and their Implications

By Bridget Allchin

In describing these sites as Middle Stone Age I am following the terminology employed by Subbarao in his recent book *The Personality of India*. Here he uses Middle Stone Age to cover 'an enigmatic group of stone industries', which fall, typologically and stratigraphically, between the hand-axe industries on one side and the microlithic industries on the other: these two latter he calls Early and Late Stone Age respectively.[1] This three-fold division is better fitted to the material, much of which has come to light in the last two decades, than any earlier system of classification. That put forward by Cammiade and Burkitt in 1930, which was perhaps the most concise and comprehensive,[2] was based upon a much less extensive range of finds. The stone industries were divided into four major groups, corresponding in general terms to the European Lower Palaeolithic, Mousterian, Upper Palaeolithic and Mesolithic. The immense amount of work that has been done in tropical and semi-tropical regions since that time has shown the European sequence to be something of a regional phenomenon, and it is therefore not surprising that the Indian sequence should differ from it.

Malik in a recent paper goes further and describes the Middle Stone Age industries as a single 'blade-flake-scraper' industry.[3] He indicates its distribution as so far known throughout much of north-western India, and its conspicuous absence in the low rainfall area of north Gujerat. From this fact, together with the nature of the tools, which are chiefly scrapers, he very reasonably infers that it was a woodland industry.

The sites which I am about to describe extend the distribution of this industry, or, more accurately, group of industries, in Central India and the Deccan. Some of the sites also provide evidence of the chronological relationship of these industries to those of the Late Stone Age, and the fact that they include three factory sites makes it possible to add considerably to our knowledge of Indian Middle Stone Age techniques. With certain

[1] B. Subbarao, *The Personality of India*, pp. 21–35 (Baroda, 1956).

[2] L. A. Cammiade and M. C. Burkitt, 'Fresh light on the Stone Ages of South-east India', *Antiquity*, 4 (1930), pp. 327–39.

[3] S. C. Malik, 'Bombay Palaeolithic Industries: A Re-evaluation', *Jr. M.S. University of Baroda*, 6, No. 1 (1957), pp. 1–14.

exceptions all the sites described were discovered in the course of explorations carried out during the winter of 1957–8. The fact that these were explorations, rather than survey of sites already known, and that distance precludes further visits to extend or check one's observations, means that the collections are somewhat small and haphazard. Any form of statistical analysis therefore would be misleading, and I have confined myself to a general description and analysis of the tools and waste materials from each site. The exceptions are the sites in Adilabad District, which were discovered some years ago by Professor C. von Fürer Haimendorf, to whom, for so readily putting his collections at my disposal, and providing me with details of the sites, I am most grateful.

Bhera Ghat

Bhera Ghat, or Marble Rocks, is a well-known beauty spot and place of pilgrimage near Jabalpur (Jubbulpore) in Madhya Pradesh. Here the Narmada River plunges over a waterfall into a gorge, and zig-zags at increasing depth through a barrier of dolomitic limestone for about a mile, before it finally emerges on to the wide gravel beds which form the *ghat* or holy bathing place. The gorge is made more spectacular by the varying colours of its limestone walls, which include pink, white, cream and greenish grey. Being soft and easily carved this stone is used by the local inhabitants to make souvenirs which range from crocodiles and pink elephants to lotuses, lingams, incense burners, crucifixes and cigarette boxes. The gravels of the locality have long been known as a source of semi-precious stones, especially agates.

Bhera Ghat lies near the point where one of the major routes which traverse the forests of Central India, and link the Ganges valley with the Deccan plateau and the south, crosses the Narmada. The locality must, on geographical grounds alone, have been a focal point at least since later prehistoric times, and indeed this is borne out by the archaeological evidence.

Being an ancient holy place, a number of temples surround the *ghat*, and in one of these fragments of images of Mathura sandstone are to be seen, which appear to date from late Kushan times (*circa* A.D. 300). The ancient site of Tewar, some five miles to the north-east, has legendary associations with the Mahabharata, and the recent discovery of chalcolithic remains there also testifies to its antiquity. The observations which I was able to make in the locality seem to extend its importance as a centre of human occupation or activity still further back in time.

The Sites

Collections of stone tools were made at a number of sites in the locality of Bhera Ghat: (1) above the falls in the river bed both in the loose gravels and in the cemented gravels; (2) in the gorge where gravel had accumulated in a bay formed by the rapid erosion of an intrusive dyke; (3) in the extensive gravel beds below the gorge; (4) on the surface of the alluvium on the right bank above the falls; (5) and (6) on exposed rock above present flood level on the right and left banks respectively of the gorge.

The last two are Late Stone Age, or possibly even Chalcolithic factory sites. They yielded small blades and cores and geometric forms, similar to those from other Late Stone Age sites in Central India, together with a mass of factory debris. The material was almost entirely chalcedonic silica, of many different colours, and the tools were virtually in mint condition.

Site 4, on the right bank above the falls, is on the surface of the thin brown soil which tops the alluvium. It extends over an area of several square yards, between the precipitous edge of the river bank and a small path which runs parallel to it. The raw material is almost entirely agate, and much of it is banded agate. It is in the form of flakes, occasional blades, and nodules from which part of the cortex has been removed. The most likely explanation of this site seems to be that it is a place where jewellers examined their finds, and discarded any that were unsuitable for their purposes. All the material was as fresh as that from Sites 5 and 6.

Of the three sites in the river bed, 2 and 3 are simply alluvial gravel beds, probably of a very temporary nature owing to the regular flooding of the Narmada, one in the gorge and one below it, which both contain derived material. Site 1 alone requires a more detailed description.

Site 1. Above the waterfall the river flows in a broad channel. Here the limestone is exposed in some places, and in others it is overlain by a layer of cemented gravels or by loose gravel beds. Wherever their relationship can be observed the cemented gravels lie directly on the bed rock. On its right bank the river has cut a section about a mile long, which reveals the following sequence:

(*a*) Brownish soil 1 to 2 feet in depth, grading into (*b*). (Site 4 was on the surface of (*a*).)

(*b*) Yellow-brown silt approximately fifty feet in depth, containing occasional lenses of gravel, but otherwise uniform throughout. As the cliff it forms is so steep, it was not possible to examine the alluvium very closely, or to see if it contained tools.

(*c*) Cemented gravels 2 to 4 feet in thickness, containing Middle Stone Age tools.

(*d*) Bed rock (dolomitic limestone as in the gorge).

Since the Pleistocene sequence of the Narmada valley was first described by Theobald in 1860,[4] the majority of writers have agreed, following him, that it includes two main cycles of aggradation separated by a period of erosion. Both cycles begin with cemented gravels of the type already described, which are followed by clays and silts of considerable depth. As no distinction seems to have been possible on the basis of the faunal remains contained in the deposits (this is described as Pleistocene in both cases), later writers, following de Terra and Patterson,[5] have made a distinction on the basis of

4 W. Theobald, *Mem. Geol. Survey India*, **2** (1860), pp. 279–98.

5 H. de Terra and T. T. Patterson, 'Studies in the Ice Age in India', *Carnegie Inst. Pubtn. No.* 493 Washington, 1939).

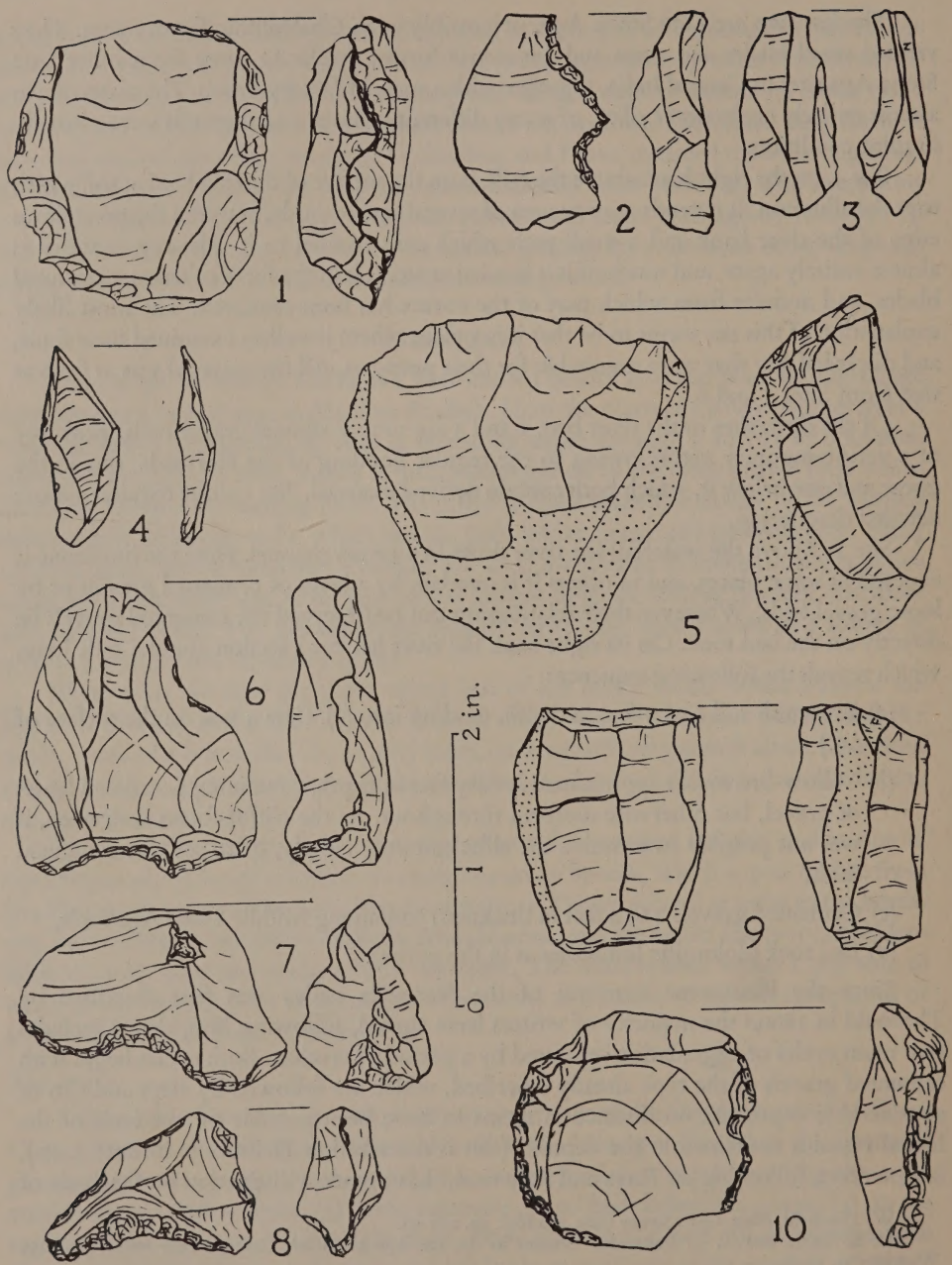


Fig. 1. Middle Stone Age tools from Bhera Ghat

the stone tools found in them. Therefore before discussing the relationship of the section seen at Bhera Ghat to the established sequence of the region it is necessary to discuss the stone industry in some detail.

The Industries

The tools from Sites 1, 2 and 3 are made of a similarly wide range of chalcedonic silica as those from Sites 5 and 6. With certain exceptions they are all rolled and patinated fairly heavily, although there is a considerable range of variation among them in these respects. At Site 1 no distinction can be made between those from the loose gravels and those from the cemented gravels, as both show the same range of variation. The tools from Sites 1, 2 and 3 may be classified as follows:

Site 1

Flakes	13	Six of these are struck from prepared cores, and are heavily rolled and patinated. With striking platforms at varying angles to the flake surface, they include two which are almost at right angles. None has a prepared striking platform. The remaining seven are smaller flakes, quite unrolled or patinated and made of agate. As the latter group were found at a spot near the bank, almost directly below Site 4, one may reasonably suppose that they fell down very recently, probably since the previous rainy season.
Blade	1	This has signs of considerable use, and has been later patinated and rolled. It is short and thick with a plain striking platform.
Straight and convex scrapers	5	All are made on flakes, and one has a prepared striking platform (Fig. 1, No. 10).
Hollow scrapers	10	Three of these are on the sides of blade-flakes; three on the distal ends of flakes, one with a prepared striking platform; two on the sides of thick flakes, and two on odd pieces of raw material. Those on the distal ends of flakes are similar to those illustrated from Sites 2 and 3 (Fig. 1, Nos. 6–8).
Concave-convex scraper	1	This is made on a large flake, with the working edges opposing one another.
Discoids	4	Three of these are cores, and one is a flake. There is no means of telling whether these were primarily intended as chopping tools or as cores for the removal of flakes. All are bifacial (Fig. 2, No. 1).
Hand axes	2	One is made on a flake and one on a core, and both are bifacially worked. In fact only a slight modification of outline distinguishes them from the last group, so it is not at all clear whether there is any functional difference (Fig. 2, No. 2).
Cores	4	These are all cores from which blade-flakes have been struck off. Two have striking platforms prepared by the removal of small flakes, and

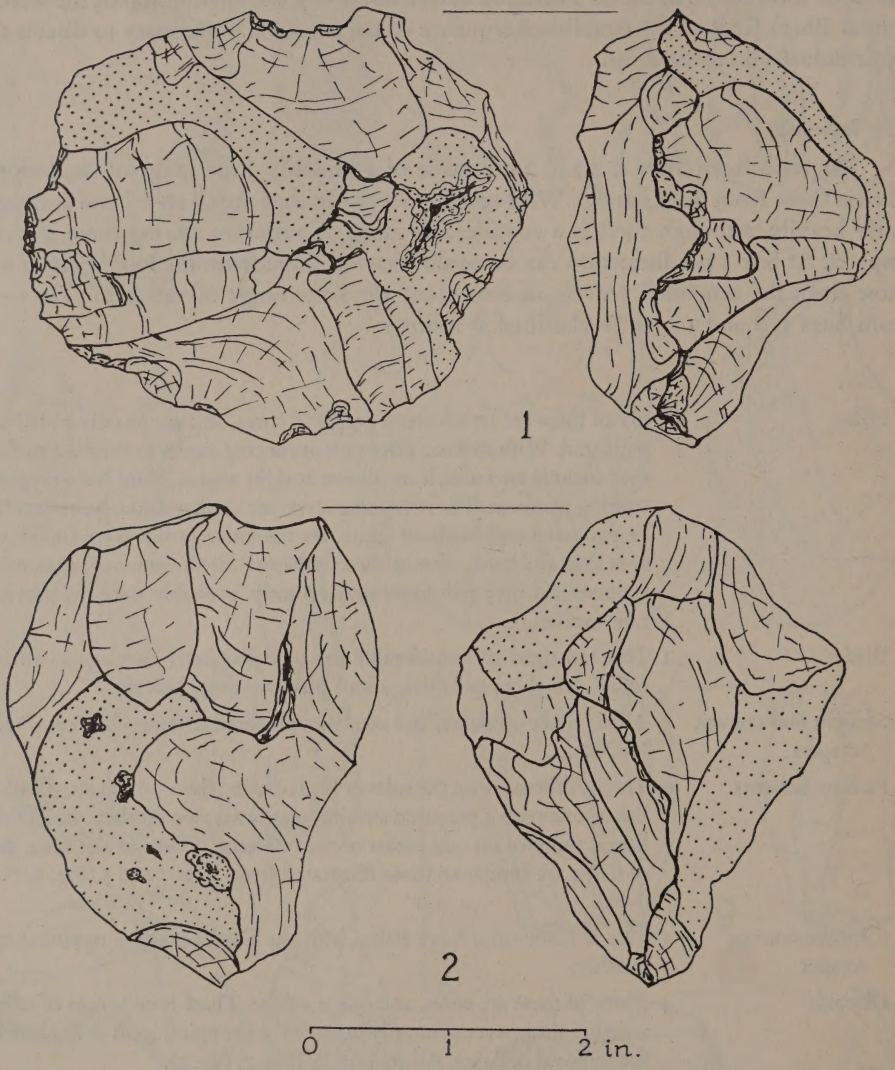


Fig. 2. Middle Stone Age tools from Bhera Ghat

		two are plain (Fig. 1, Nos. 5 and 9). No tortoise cores from which flakes had been struck, like that illustrated (Fig. 1, No. 1), were found at this site, but several of the flakes appeared to have come from such cores, as for instance that shown (Fig. 1, No. 10).
Utilised pieces	8	They include one large quartz crystal.
Site 2		
Flakes	2	Both are struck from prepared cores, and used but not retouched. One has a prepared striking platform.
Hollow scraper	1	The scraper edge is on the distal end of a flake.
Nosed scraper	1	This is made on the side of a broad flake, which may also have been used as a hollow scraper along the distal end.
Core trimming flake	1	The bulb of percussion has been removed, and it has been utilised as a spokeshave—probably Late rather than Middle Stone Age.
Utilised pieces	2	
Site 3		
Flakes	22	Two of these had prepared striking platforms, and twenty had not. Of these twenty all were used and rolled, and on the basis of size and patination, eighteen appeared to belong to the Middle Stone Age group, and two to the Late Stone Age group.
Blades	4	All were used, and shape and condition suggested a Late Stone Age origin.
Straight or convex scrapers	8	Six of these are on flakes, and one of them has a prepared striking platform. The remaining two are on pieces of tabular rock.
Hollow scrapers	10	Seven of them are on the distal ends of flakes (Fig. 1, Nos. 6–8), one is on the side of a flake, and two are on pieces of tabular rock.
Double hollow scraper	1	On the side of a flake (Fig. 1, No. 2).
Multi-concave scraper	1	On the side of a flake.
Points	4	One is made on a thick flake, much used and heavily patinated, and three are unpatinated and very much smaller, and probably therefore Late Stone Age in origin (Fig. 1, No. 4).
Discoid	1	It is almost spherical in outline.
Tortoise core	1	A flake has been struck from it (Fig. 1, No. 1).
Blade-flake cores	2	These are similar to those illustrated from Site 1 (Fig. 1, Nos. 5 and 9).
Blade cores	3	Their nature and condition both indicate that they belong to the Late Stone Age group.
Guide-flakes	2	Like the blade cores they are clearly Late Stone Age.

Although all the material at Sites 1, 2 and 3 is ultimately derived, and therefore of somewhat uncertain origin in terms of both time and space, a certain general uniformity of character can be seen in the majority of the specimens. This is very marked if we exclude those already mentioned above which can be distinguished from the main body of material on the basis of both form and patination, and attributed to a Late Stone Age or Chalcolithic source. Most of the tools are not only more heavily patinated and larger than the Late Stone Age group, they also show a complete absence of the technique of producing small parallel-sided blades from a cylindrical or conical core, which is the hallmark of the Late Stone Age in India. In this Middle Stone Age assemblage two techniques of manufacture can be seen, sometimes overlapping but generally distinct. The first technique is that of striking a flake from a carefully prepared discoidal core, such as that illustrated in Fig. 1 (No. 1). A typical flake of this kind is also shown in Fig. 1 (No. 10). This of course has close parallels in the Levallois-Mousterian industries of Europe, and also in the African Middle Stone Age. The second technique consists in striking more or less parallel-sided blade-flakes from one or more sides of a suitable piece of raw material (Fig. 1, Nos. 3, 5 and 9). The difference between this and the Late Stone Age technique of blade production lies in the size and proportion of the blades and blade-flakes, the former being very much shorter and thicker in relation to their length, and more irregular in outline than the latter. A further difference is in the nature of the fracture which is best illustrated by the core: on the Middle Stone Age core the flake scar, and especially the negative impression of the bulb of percussion, is much deeper and more rounded than that of the Late Stone Age blade core. This clearly indicates a different method of applying the blow, possibly by direct as opposed to indirect percussion. Possible parallels for this second technique, especially in Western Asia, deserve further investigation.

In the case of both techniques the striking platform is sometimes faceted, but more often plain, and its angle with the flake surface varies considerably, as can be seen by looking at the specimens illustrated. A remarkable feature of the whole Middle Stone Age assemblage is the high proportion of scrapers of various types, made on both flakes and blade-flakes, which it includes. The retouch in all cases is steep and, by comparison with that found on Late Stone Age tools, coarse and irregular, again suggesting a different means of percussion. Some of the irregularity however may be attributed to use. Certain of the scrapers, indeed, particularly those on the distal ends of flakes, give the impression of having been repeatedly re-edged like the *tula* adze-blades of the Australian aborigines, and so reduced to a mere fraction of the size of the original flake. The group of three scrapers shown in Fig. 1 (Nos. 6, 7 and 8), illustrates this process hypothetically.

There is little doubt that cores of both types were utilised as chopping tools, for several bear signs of considerable use. Whether the discoids were primarily intended as chopping tools, or as prepared cores, from which for some reason flakes were never removed, is not clear. If an analogy may be drawn once more from the Australian aborigines, it is possible that the makers themselves had an open mind on the matter.

The presence of possible hand-axes in the assemblage raises a number of problems.

(*a*) A view of the cinder mound cutting by the roadside, Kudatini, Bellary District, Budikanama Pass, consisting mainly of vitrified slag (phot. Arch. Survey, India, neg. 1948–9, No. 12).

(*b*) A general view of the cinder mound at Gadiganuru, Bellary District, from the south. It consists mainly of loose ash and is banked against a ridge of crystalline rock (phot. Arch. Survey, India, neg. 1948–9, No. 13).

As already suggested, of course, it is possible that the pear-shaped outline is fortuitous, and that from a functional point of view they should be classified with the discoids. If this is not so, then they must be regarded either as derived from earlier deposits, contemporary with the main body of hand-axe industries, or as forming an integral part of the Middle Stone Age group of industries. The latter possibility is supported by the presence of a small hand-axe at an undoubted Middle Stone Age factory site at Pandav Falls (see below). This fact however does not automatically exclude the former possibility.

Dating

As I have already pointed out, the only evidence, other than direct stratigraphical relationship, on which the two major aggradation cycles of this section of the Narmada river in Pleistocene times can be distinguished from one another is the nature of the stone tools they contain. As early as 1893 the fact that they did contain tools was recorded by Oldham,[6] but it was not until 1939 that de Terra and Patterson found that with certain exceptions, probably due to redeposition, the deposits of the first aggradation cycle contained a hand-axe industry, and those of the second an industry 'well within the range of the Late Soan . . . with pebble choppers, beaked tools and cores'. They also found a third minor cycle of aggradation including new alluvium and gravels, but no cemented gravels, with which was associated 'a flake assemblage characterised by the dominance of small blades and scrapers'. Unfortunately lack of illustrations makes their descriptions of tools very difficult to follow.

The nature of the cemented gravels, and the great depth of silt above them, in the section exposed at Bhera Ghat, definitely indicate that it represents one of the two major cycles of aggradation, while the nature of the tools it contains equally definitely excludes the first cycle. This leaves no alternative but to associate the Middle Stone Age industries of this locality with the beginning of the second aggradation phase of the Narmada. Malik (*loc. cit.*) has already pointed out that industries of this group are associated with the corresponding phase as a whole in the Bombay area, and also on the Middle Narmada. His observations are based upon the work of Drs. Sankalia, Subbarao and Deo in the Maheshwar region,[7] where they found Middle Stone Age tools both in the central part of the second aggradation deposit, and in the black soil which overlies it. Of the former they write: 'Technologically these may be regarded as the forerunners of the industry which is found in large quantities in the black soil'. All writers are agreed that the tools from the black soil at Maheshwar are similar to those found by de Terra and Patterson in their third cycle of aggradation. The Middle Stone Age industries of the middle and upper Narmada therefore span the entire period of the second aggradation phase. This must represent a very considerable period of time; a period during which one would expect to find changes and developments taking place within the tradition. Such changes were

[6] R. D. Oldham, *A Manual of the Geology of India* (Calcutta, 1893).

[7] H. D. Sankalia, B. Subbarao and S. B. Deo, 'The Archaeological Sequence of Central India'. *South-western J. of Anthropology*, **9**, No. 4 (1953), pp. 343–56.

noticed at Maheshwar; and at Hoshangabad and Narsinghpur it was the differences, rather than the similarities, in the earlier and later Middle Stone Age industries that were noticed by de Terra and Patterson. When the tools from the cemented gravels at Bhera Ghat are compared to those illustrated from the black soil in the Maheshwar region, it can be seen that, while there are a number of essential features in common, there are also differences. In both cases the prepared core and blade-flake techniques appear side by side, but in the later group of tools they overlap more closely. Prepared striking platforms are fairly common in both groups. One has the impression that both blade-flakes and prepared striking platforms increase in numbers with time, but a more detailed study of much larger collections would be necessary to prove this. In both groups scrapers predominate among finished tools, and points of any kind are rare. The outstanding difference lies in the size, and the quality of the retouch, for the tools of the younger group are considerably smaller and better finished than those of the older. There is no indication however of a change in the method of percussion, which remains distinct from that of the Late Stone Age throughout.

The question now arises, what was the relationship of the later Middle Stone Age industries to the Late Stone Age in this part of India. There are numerous Late Stone Age sites in the hills both north and south of the Narmada. In an attempt to answer this question I visited a number of caves some distance to the north and north-east of Bhera Ghat which contain Late Stone Age tools and rock paintings in plenty. In none of them was I able to discover either deposits of any depth, or any sign of Middle Stone Age occupation, in spite of the fact that both Middle and Late Stone Age factory sites were to be found in the same region.

It is chiefly to factory sites on the surface in this and other regions that we now turn to supplement the information obtained from derived material in the Narmada alluvium.

Bundelkhand

All the sites in this group lie on the northern edge of the north-easternmost extension of the Vindhya hills, where the uplands of Central India fall away in a series of plateaux and escarpments to the alluvial plains of the Ganges—Jamuna Doab. They include a factory site near Pandav Falls, which has apparently lain virtually undisturbed since the departure of the tool makers; the gravel beds of the Baghain river at a point immediately below the main escarpment; and a number of stray finds from fields in the southern part of Banda district.

Pandav Falls ($63\frac{D}{NW}$ 2 1 inch = 1 mile Survey of India, 1869–70)

This site lies near the main road which runs eastward from Chattapur to Rewa. After crossing the Ken river the road climbs a steep escarpment, or rather two escarpments, altogether several hundred feet in height, to the town of Panna. On reaching the short stretch of level ground which separates the two escarpments the road bends northward to

cross a small tributary stream of the Ken river. A few hundred yards west of the road at this point the stream plunges over the lower escarpment. The place is known as Pandav Falls, and on the right bank of the stream, between the road and the falls, we found a fairly extensive Middle Stone Age factory site.

The underlying rock is Vindhyan sandstone. It is covered at this point by no more than a few inches of dusty reddish-brown soil, and even this appears to be in process of being slowly eroded away, exposing great patches of bare rock. The tools and factory debris therefore are found sometimes on the bare rock, and sometimes embedded in the remaining pockets of soil.

At first sight the majority of the tools appear to be made of grey limestone, but on closer examination they show a clear concoidal fracture, similar to that seen in chalcedonic silicas or very fine quartzites. Some peculiar weathering process must have taken place since the tools were made, which has completely changed their appearance. The result is quite different from the glossy ochreous patina found on Middle Stone Age tools at so many Indian sites, for these have a matt surface which in some cases has become porous like a soft pumice. Whether their peculiar appearance is due to the nature of the original raw material, or to processes which the tools have undergone since they were made can only be settled when they are available for expert examination. At the time of going to press this was impossible, as their dispatch from India has been delayed owing to Customs formalities. Only the small number of quartz specimens were virtually in mint condition. The tools and factory debris show no signs of rolling. It must be borne in mind that any collection made at a factory site is necessarily selective, and that the proportion of debris on the site was much higher than that recorded here. With this reservation the collection may be classified as follows:

Flakes	24	The majority were evidently struck from prepared cores, and the angle of flake surface to striking platform varies considerably, including several right angles. Three had prepared striking platforms, several were broken, and many used.
Blade-flake	1	(Fig. 3, No. 3)—see below, Scrapers.
Straight or convex scrapers	5	Two are on flakes, one with and one without a prepared striking platform (Fig. 3, No. 2), two are on tabular material, and one is on the end of a blade-flake (Fig. 3, No. 3).
Hollow scrapers	3	One on a flake and two on pieces of raw material.
Nosed and double hollow scrapers	3	All on flakes.
Discoids	6	One of these is comparatively large and the remaining five which are of quartz are very small.
Hand-axe	1	This is indisputably a hand-axe, and is made of quartz (Fig. 3, No. 6).
Points	2	Both are simply heavily used pointed flakes. The use marks in one case might in fact be very coarse retouch; whichever may be the case, the

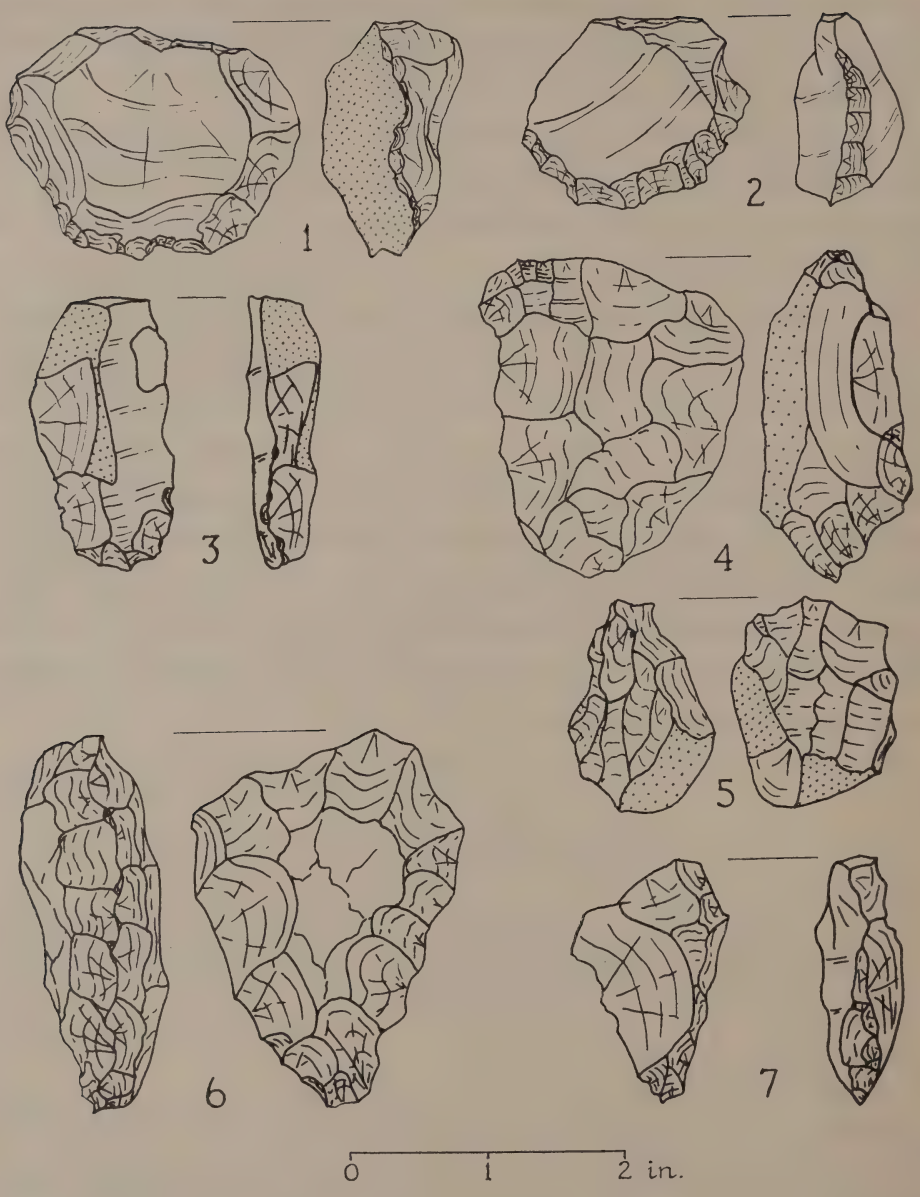


Fig. 3. Middle Stone Age tools from Pandav Falls

		fact that small flakes have been removed from one side along one edge and from the other side along the opposite edge is interesting as it suggests rotary motion (Fig. 3, No. 7).
Tortoise cores	5	One of these has been struck and four are unstruck (Fig. 3, Nos. 1 and 4).
Cores	5	These are not sufficiently carefully finished to be classed as tortoise cores and they are certainly not blade-flake cores, but flakes have undoubtedly been removed from them by man.
Chopping tools	5	All are comparatively small, and all, with one exception, are made on pebbles (Fig. 3, No. 5).
Used pieces		A large quantity of amorphous pieces of raw material of all sizes, many of them showing clear indications of use by man, was present at the site. The chief interest that attaches to them is that their nature and numbers clearly indicate a factory site. Many of them appear to be flakes removed in the preparation of cores.

In this assemblage blade-flakes, and the cores from which they have been struck, are conspicuous by their absence. The one example pointed out above could well be fortuitous. In fact only one of the traditions of stone working seen at Bhera Ghat is represented here. This is the prepared core technique (to call it a Levallois technique seems to suggest a degree of parallelism and contemporaneity which is scarcely justified at this stage). The cores, the flakes struck from them, the type of retouch, and the accompanying discoids resemble in every respect those from the Narmada site. The difference lies in the absence not only of blade-flakes, but also of the scrapers made on the distal ends of flakes with reworked scraper edges, which were so common there. As the Bhera Ghat material is all derived the absence of these forms at Pandav Falls can be interpreted in a number of ways. The presence of a hand-axe at Pandav Falls, however, strengthens the case for the hand-axes at Bhera Ghat being contemporary with the Middle Stone Age tools, rather than derived from earlier deposits.

The fact that, although this has every appearance of being a factory site, many of the flakes bear evidence of use suggests that it was a factory site not only for stone tools, but possibly for tools and weapons which incorporated other substances such as wood, or alternatively that it was a living site.

Baghain River Gravels ($63\frac{D}{NE}9$ 1 inch = 1 mile Survey of India, 1868–79)

This collection was made from the gravels of the Baghain river and its tributaries in the vicinity of Kauhari village, about five miles south of Kalinjar Fort in Banda district. The Baghain is a tributary of the Ken, which in turn flows into the Jumna. Kauhari village lies at the foot of one of the main escarpments of the Vindhyas, down which the Baghain and its tributaries flow with tremendous force during the monsoon. Consequently the gravels and the tools they contain are extremely heavily rolled.

In addition to being heavily rolled and sometimes battered, the majority of the tools are considerably patinated. They are made of a variety of kinds of chalcedonic silica, and

some are made of a rock which may be porcelain jasper, or porcellanite. They may be classified as follows:

Flakes	9	All are struck from prepared cores, and several have a near right angle formed by the flake surface and striking platform. None have prepared platforms. There is great variation in size, the largest being almost worthy of the name of chopper.
Blade-flakes	6	All show signs of use, probably as spokeshaves, and one has a prepared striking platform.
Straight or convex scrapers	11	All are on flakes, with the exception of one which is on a piece of tabular material. One has a prepared striking platform. Two of those made on flakes bear retouch which postdates the patination and rolling, indicating that they were re-utilised at a date long after their manufacture. One is altogether in pristine condition.
Hollow scrapers	2	One is made on an amorphous piece of raw material, and one on a flake. In the case of the latter the retouch of the scraper edge postdates both patination and rolling, as it does on two of the group above.
Discoid	1	It is comparatively small.
Choppers	2	One is very crude and made on a lump of tabular material, and the other very small and well finished.
Point	1	It is simply a pointed flake.
Cores	7	Five of these are small blade-flake cores, three of which are so rolled and battered as to be scarcely recognisable. The remaining two are Late Stone Age blade cores, equally heavily rolled, but not so heavily patinated as the others.

This is clearly a somewhat miscellaneous collection of derived material, in which all the elements found at Bhera Ghat are present, with the exception of the distinctive re-edged scrapers. Its interest lies chiefly in the fact that the prepared core technique and the blade-flake technique noticed in the Bhera Ghat collection are both present, and that it extends the distribution of Middle Stone Age industries in this area. The small size of all five blade-flake cores is also notable, and may indicate either development towards, or influence from the Late Stone Age industries. Unfortunately all these cores were so battered that it was impossible to make detailed comparisons.

Kauhari Fields

In the fields immediately south of Kauhari Dak bungalow, and in close proximity to the implementiferous gravels described above, I picked up a few Middle Stone Age tools, made of various types of silica, and possibly porcellanite, somewhat patinated and altogether unrolled. These included six flakes struck from prepared cores, one small,

delicately made tortoise core from which a flake had been struck, and two rather amorphous cores which might have been either tortoise cores or discoids abandoned before they were completed.

Rehuntiya

The road from Khoh to Rehuntiya in Banda district runs along the extreme southern edge of the Ganges alluvium, a few hundred yards north of the lowest escarpment of the Vindhyas. The plateau edge appears to break down, and a number of residual outcrops extend into the plain. One of these, about half-way between Khoh and Rehuntiya, lies within fifty yards of the road. Unfortunately we were unable to discover any specific name for this hillock. On its slopes were strewn flakes and pieces of some kind of cryptocrystalline silica. This appeared to occur in tabular form, and judging by the quantity which lay about, the source must have been near at hand, although we were unable to find it. All the pieces were unrolled and considerably patinated, and, the ground where they lay being rather bare and subject to erosion, they gave the impression of having lain on the surface for a very long time. We searched for some time and were unable to find anything which could be described definitely as a tool or a by-product of tool making, although we had a strong impression that the material which lay about was factory debris. Just as we were leaving we came upon a core (Fig. 6, No. 6), and a point made on the proximal end of a flake. Both unmistakably belonged to a Middle Stone Age industry, but were somewhat peculiar in appearance, evidently being made on comparatively thin pieces of tabular raw material. This is the most north-easterly point at which I found Middle Stone Age tools, and it is of particular interest as it lies so near the Ganges alluvium.

Adilabad Highlands

This region lies some 200 to 300 miles south of Bhera Ghat, in the catchment area of the eastward flowing Godavari. Here the forested hills, and the escarpments and rift valleys of Central India give way to the gently rolling ancient peneplains of the Deccan Plateau. Geologically the region is a mixed one, including gneisses, and Puranas, sedimentary rocks which are frequently metamorphosed. Adilabad district in fact might be described as part of the transitional belt which lies between two major geographical regions. The Adilabad Highlands themselves form a plateau with a gently undulating surface, intersected by the steep valleys of tributary streams, lying between the Godavari and Penganga rivers.

Some years ago collections of stone tools were made in this region by Professor C. von Fürer Haimendorf. The tools cover a wide range of types and techniques, all within the Middle Stone Age tradition. Professor Haimendorf informs me that the smaller ones in particular, similar to those from Khanapur described below, may be picked up in almost any ploughed field in the district, and are also to be found on the surface of uncultivable land, sometimes in considerable concentrations at definite sites, but more

often singly or in twos and threes. The majority of the sites lie on the plateau, but in hollows or on the lower slopes of small hillocks, seldom if ever, on their crests or down in the river valleys.

Jamuldhara (56 $\frac{M}{SW}$ A4)*

This site lies about two miles from the village of Jamuldhara on the cart track to Pangri Madra and on the slope of a hill in uncultivable forest land, at about 1,600 feet above sea level. The tools and waste material are to be found in large quantities on the surface within a radius of two or three hundred yards. The raw material appears to be a crypto-crystalline silica with an ochreous yellow patina. Wherever a fresh surface is visible it looks like a grey or greyish-buff chert.

The tools may be classified as follows:

Flakes	5	All are large and thick, and three are struck from prepared cores. Of these the smallest has a prepared striking platform. On all of them the angle of the striking platform closely approaches a right angle, and all show signs of considerable use. The battering and chipping of their edges suggest that they were used as chopping tools.
Blade-flake	1	This is broken and shows signs of use.
Straight or convex scraper	1	Made on a large flake struck from a prepared core, with scraper edges on two sides.
Hollow scrapers	3	All are made on flakes struck from prepared cores. In one case the scraper edge is on the side of the flake and in two cases it is on the distal end. One of the latter is of the re-edged type.
Triangulate scraper	1	This is a bifacially worked tool with three concave and three convex working edges, similar to but cruder than those from Krishna Bridge and Kondapur described below (pp. 25, 28).
Chopping tools	2	On pieces of raw material.

Keslapur (56 $\frac{1}{NE}$ B6)

This collection was made within a half-mile radius of the village of Keslapur, chiefly in ploughed fields. This is a black cotton soil area of level country, about 1,400 feet above sea level. In raw material, patination and general character the tools closely resemble those from Jamuldhara. They may be classified as follows:

Flakes	8	All are similar to those from Jamuldhara, but there are no prepared striking platforms.
Blade-flake	1	Similar to that from Jamuldhara.

* All map references in this section are to the Survey of India 1 inch = 2 miles series, published in either 1929 or 1930.

Straight or convex scrapers	2	Both are made on pieces of raw material.
Hollow scrapers	5	All are made on pieces of raw material with natural hollows which have been utilised.
Beaked tools	5	All are made on pieces of raw material, and three have a hollow scraper edge on either side of the beak (Fig. 4, No. 1).
Choppers and chopping tools	6	All are made on pieces of raw material.

Although Keslapur and Jamuldhara are in different localities with different types of soil, the tools are very similar and have many features in common, including their size and clumsiness. When they are compared with those from other sites we have discussed, this is quite remarkable. The prepared cores from which some of the flakes were struck must have been gigantic. Another curious feature particularly of Keslapur is the number of tools made on odd pieces of raw material.

Khanapur (56 $\frac{1}{NE}$ C6)

Khanapur is in forest country about 1,700 feet above sea level. The tools lie on a slope near the village of Khanapur, on the track to Chidhari, on the surface and within a radius of 100 or 200 yards. The tools are made of various kinds of crypto-crystalline silica, including chert, jasper and blood-stone. Some have a thin film of yellowish patina. They may be classified as follows:

Flakes	3	Two are squarish, and all their edges are heavily used. The third is thick and rounded and considerably battered along one edge, probably as the result of having been used as a chopper (Fig. 4, No. 4).
Straight or convex scrapers	3	All are made on the sides of flakes struck from prepared cores and one has a prepared striking platform (Fig. 4, No. 5).
Hollow scrapers	6	Two are like spokeshaves, made on the sides of blade flakes, both of which have prepared striking platforms. The other four are made on flakes from prepared cores, two on the sides, one on the corner and one on the distal end. Of these the third has a prepared striking platform (Fig. 4, Nos. 3, 6 and 7).
Eloura (see p. 35)	3	These are all rather crude specimens (Fig. 4, No. 2).
Discoid	1	This may be intended either as a prepared core or a chopping tool, but the preparation of both surfaces suggests the latter.

Chidhari (56 $\frac{1}{NE}$ C6)

Chidhari village lies almost three miles south-south-west of Khanapur. The tools are found near the village, beside the path to Khanapur, on a steep slope in a forest area.

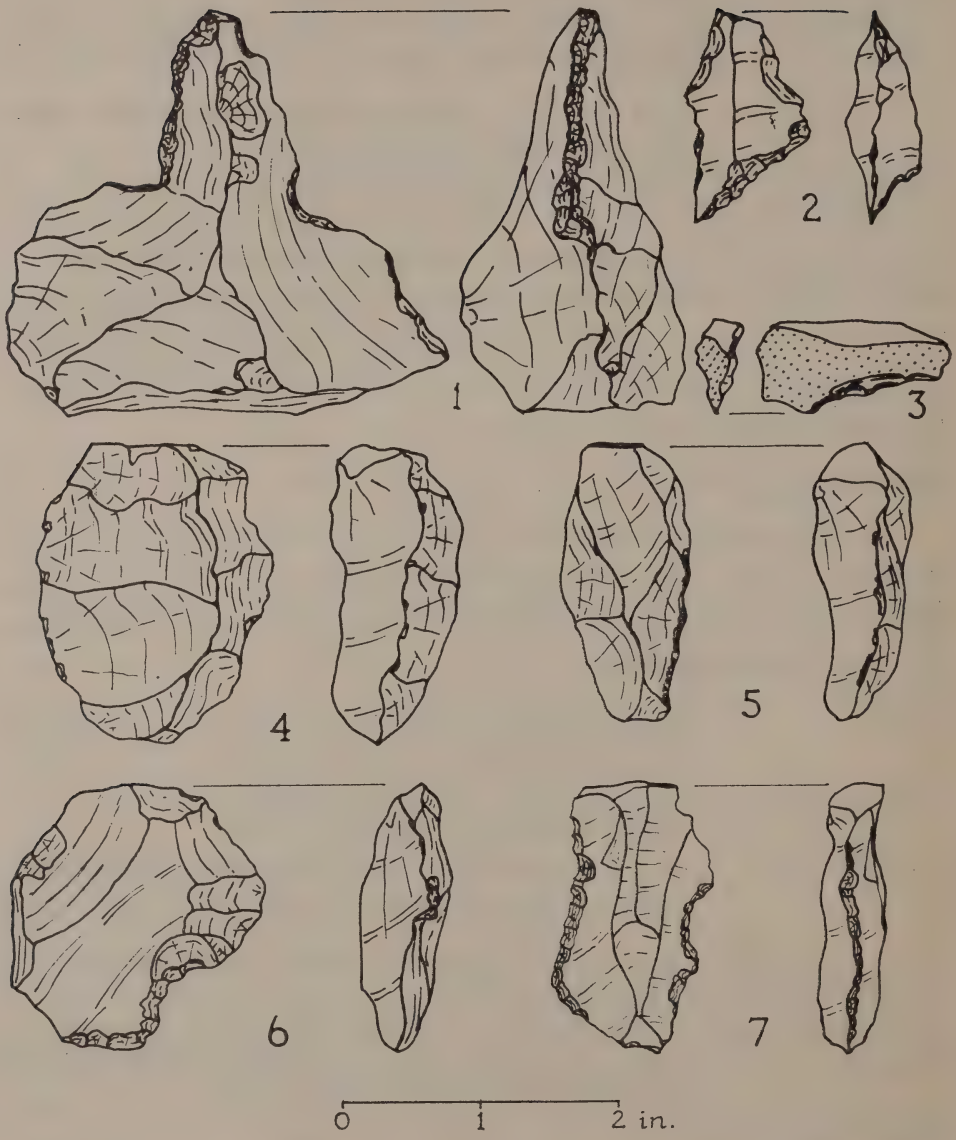


Fig. 4. Middle Stone Age tools from the Adilabad Highlands
1: Keslapur; 2–7: Khanapur

On the basis of a very marked difference in patination the tools from this site can be divided into two groups: (1) heavily patinated, and (2) unpatinated. This difference however does not appear to correspond exactly to a technological distinction, so it is just possible that it may be due to a difference in the raw material.

The two groups may be classified as follows:

(1) *Heavily patinated*		
Flakes	4	These are all struck from prepared cores, but have fairly wide-angle striking platforms. All are slightly retouched, and might almost be classified as scrapers, but the retouch is very shallow and irregular, so they do not seem to justify this term.
Beaked and double hollow scraper	1	This is a large specimen, roughly made on a piece of raw material.
Keeled scraper	1	This again is large and roughly made.
(2) *Unpatinated*		
Flakes	3	All are struck from prepared cores, and all are used.
Scrapers	2	Both are made on the sides of flakes, and the scraper edges are very slightly concave, suggesting spokeshaves.
Chopper	1	This is made on a piece of raw material.
Core trimming flake	1	
Pieces of raw material	7	All of these appear to have been used, probably for general cutting and chopping purposes, and three of them, which are curious long pieces of stone, appear possibly to have been used as spokeshaves.

Marlawai (56 $\frac{1}{SE}$ E2)

The village of Marlawai lies about 20 miles south-east of Khanapur. Here the tools were found around the sides of a shallow circular depression, in which the village lies, at approximately 1,700 feet. Black cotton soil covered the bottom of the depression, but that on the slopes where the tools lay was reddish-brown and partly uncultivated. The raw materials are similar to those used at Khanapur. The condition of the majority of the tools, which are only lightly patinated is also similar. A group of eight tools, four flakes struck from prepared cores, two convex scrapers made on similar flakes, and two blade-flake cores, one large and one small, differ from the rest of the collection in being heavily patinated. The tools of the main group may be classified as follows:

Flakes	9	All are struck from prepared cores, and one has a prepared striking platform. All show signs of use, particularly the larger and more regularly shaped ones, which show a degree of chipping and battering along the convex edges which suggests that they have been used with considerable force.

Blade-flakes	2	Both are used.
Straight or convex scrapers	12	Two of these are on the sides of rounded flakes, one of which has apparently broken in half longitudinally while in use. Two are on small pieces of raw material, three are on the distal ends of roundish flakes, and have a suggestion of re-edging, and five are on the distal ends of small blade-flakes, and might almost be classed as thumb-nail scrapers.
Hollow scrapers	7	Two are on the distal ends of squarish flakes, one worked from the flake surface, and the other from the upper surface. The other five are made on odd pieces of raw material.
Double scraper	1	This is made on a squarish flake. A hollow scraper edge has been made on either edge, one by working from the upper surface, and the other by working from the flake surface.
Beaked tools	3	Two of these are quite small, and made on flakes, one a simple beak, and the other a beak with a concavity on either side. The third is made on a large, thick flake weighing almost two pounds. The distal end of this tool, which is broader than it is long, has been made into a chopper, while on either side a large beak has been made, one the simple type, and the other with a concavity worked on either side.
Eloura	1	This is of the regular segmental type, made on a blade-flake and resembling a large, thick and rather dumpy lunate, except that it shows considerable signs of use and battering along the arc where it has been retouched.
Used pieces	2	These both appear to have been used as chopping tools.

The tools from the Adilabad Highlands clearly fall into two groups. The first group includes the large heavily patinated tools from Jamuldhara and Keslapur, together with series (1) from Chidhari and the eight heavily patinated tools from Marlawai. Although this group falls within the Middle Stone Age tradition the tools are much larger than any Middle Stone Age tools either from the Narmada valley, or from Bundelkhand. Characteristic tools of this group are large flakes, struck from prepared cores, often with prepared striking platforms, and sometimes retouched. There are no blade-flakes or blade-flake cores, and very few finished tools. One has the impression that these are either very early, or, more likely, from sites where certain activities only went on, such as felling trees, roughing out blocks of wood for future use, etc. There are many analogies for this type of 'single job site' to be found among records of Australian aboriginal life[8] and if this is the explanation these tools might belong to almost any stage within the Middle Stone Age. The heavy patination argues against a late date, therefore it seems most probable that they date from the early part of the Middle Stone Age. When compared to the Middle Stone Age tools from the cemented gravels at Bhera Ghat they appear to represent a

[8] B. Allchin, 'Australian Stone Industries Past and Present', *Jr. Roy. Anthrop. Inst.*, **87**, Part 1 (1957), pp. 115–36.

different activity rather than a different culture. The prepared core technique seems too highly developed to associate them with any Early Stone Age industry that has so far been found in India.

The second group, which includes the tools from Khanapur, and the main groups from Chidhari and Marlawai, clearly has affinities with the later Middle Stone Age industries of the Narmada valley.

The Deccan

The next two sites are in the central Deccan, some 300 and 200 miles respectively south of the Adilabad Highlands. The first overlooks the river Krishna, and the second overlooks a small nalla. The rainfall here is lower today than that of any of the regions previously discussed. It is predominantly a region of granite rocks and black cotton soil. The peculiar feature which these two sites have in common is that each is within a hundred yards of a typical Indian Late Stone Age factory site. The more southerly site is described first, as it was not possible to make an exhaustive classification of the tools from the more northerly one, which were unexpectedly delayed in New Delhi.

Krishna Bridge ($56\frac{H}{SW}$ 7 1 inch = mile Survey of India, 1921–2)

This site lies near the main road from Raichur to Mahbubnagar, on the south bank of the Krishna. It is about two furlongs west of the modern road, and about the same distance from the river. A hillock, formed by a small granite outcrop, rises out of the plains and marks the site. The soil of the surrounding plains is rich and clayey, and black or brown in colour, and it is interrupted at long intervals by groups of residual granite hills, or single small outcrops like this one. Each outcrop is surrounded by a belt of red sandy soil, like a beach round an island, which consists of particles of disintegrating granite. This hillock is no exception, and the soil on the slopes, although regularly cultivated, is thin and stony.

When my husband and I first visited this site, over six years ago, we found a typical Late Stone Age factory site on top of the hillock, with the usual range of geometric forms, blades and blade cores, together with other by-products and large quantities of factory debris. These were made of many kinds of silica, including the chalcedonic varieties, and an occasional piece of quartz. Often this material had clearly been in the form of river pebbles and the tools were scarcely, if at all, patinated. Although no Late Stone Age sites had been reported in this particular region, so many parallels, both as regards the stone industry, and the situation on a hillock of this kind, were known from adjoining regions that we had no hesitation in identifying it. One question did occur to us, whether it had persisted as a factory site into Neolithic times, for similar blades are found in large quantities at Neolithic sites in the region. We also found several circle graves, belonging to the South Indian Iron Age within a few hundred yards of the site.

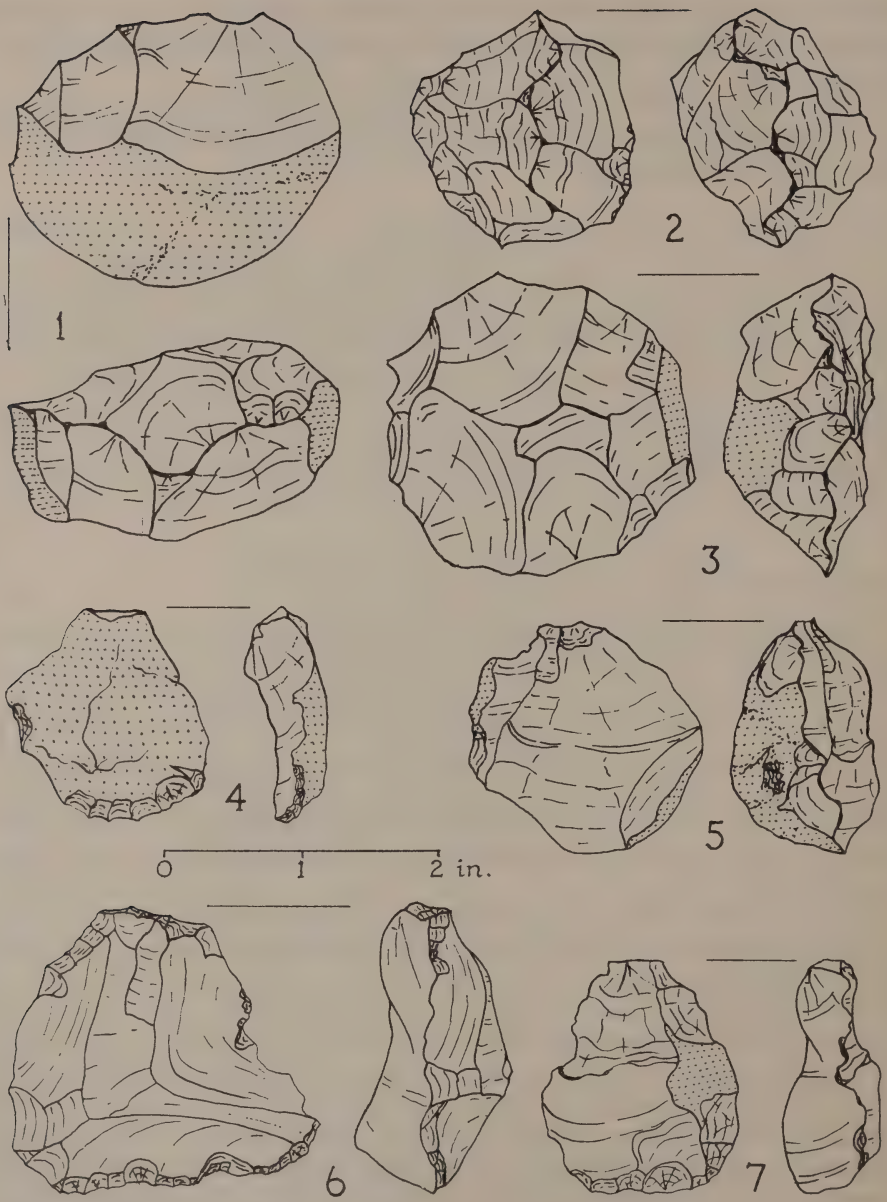
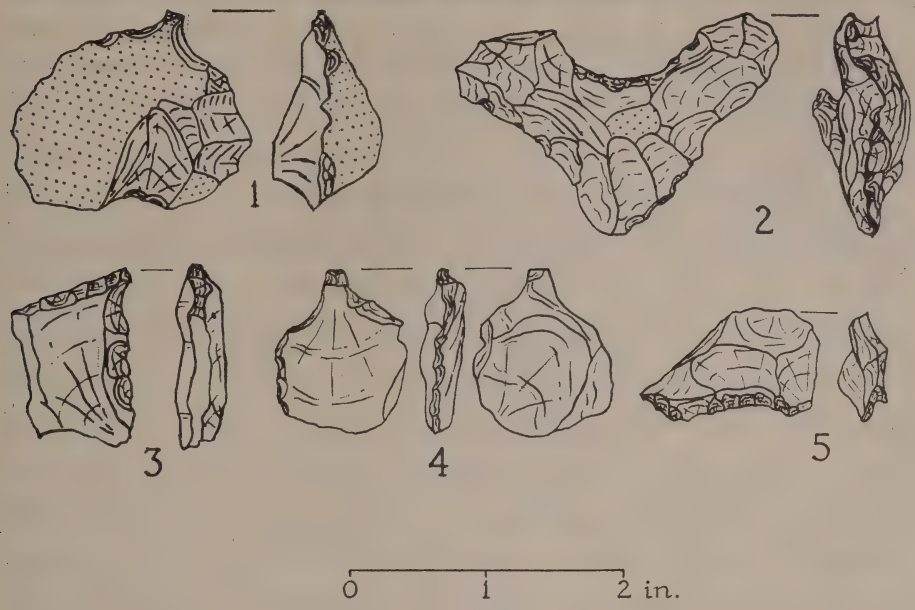


Fig. 5. Middle Stone Age tools from Krishna Bridge



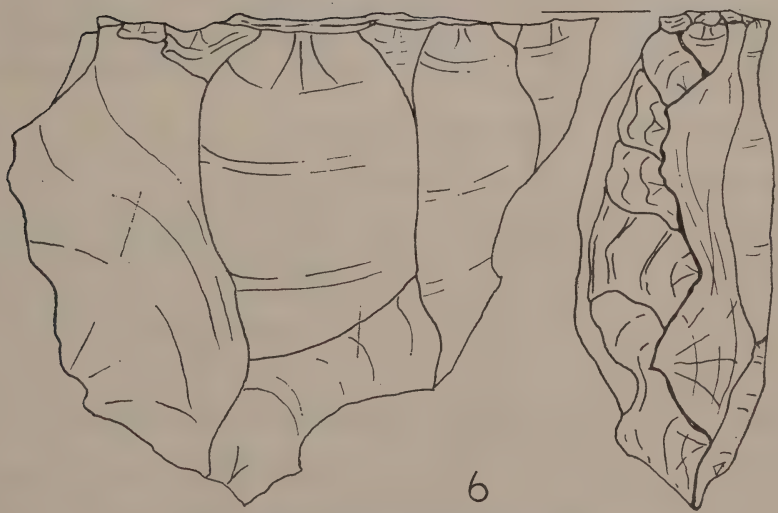


Fig. 6. Indian Middle Stone Age tools
1–5: Krishna Bridge; 6: Rehuntiya

On our second visit in 1957 we approached the site from a different direction, and found, on the south-eastern slope of the hill, a Middle Stone Age factory site, to which we shall refer as Site II. The tools here, although apparently made of a similar range of raw materials to those at the Late Stone Age site, which we shall now call Site I, were covered with a thick glossy ochreous patina, which, seen in section, resembled rind on cheese.

As the soil all over the site has been constantly ploughed in recent times, the actual extent of the original working floors is not clear. The area of greatest concentration of tools of each industry is quite distinct however, and they are separated from one another by almost 50 yards. None the less there is some overlap in the peripheral spread of tools and waste material from each site. Those from the intervening area can often be classified, on the basis of both form and patination, as belonging definitely to either the Middle or the Late Stone Age group. The factor which makes these tools distinct from both the other groups is that many of the Middle Stone Age tools and by-products from this area, which we shall call Site III, are smaller than those from Site II. They are made almost exclusively of jasper, and are definitely less heavily patinated than the majority of those from the main concentration of Middle Stone Age tools, although even there a few smaller, more lightly patinated, jasper tools are to be found among the rest. At the time I was inclined to dismiss this difference as purely coincidental, attributing it to the fact that the jasper probably not only occurred in smaller nodules, but also patinated less readily than other raw materials at the site. Even then the fact that there was something of a concentration of these tools between the two main factory areas was hard to explain, and subsequent discoveries have added some weight to the suggestion that they actually represent a later phase of the Middle Stone Age industries. They are in fact closely comparable to the tools from Khanapur and related sites in the Adilabad Highlands (p. 20), and also to those illustrated by Sankalia and others (*loc. cit.*) from the black soil layer on the Narmada near Maheshwar.

The tools from *Site II* may be classified as follows:

Hammer stones	2	Ovoid quartz pebbles battered at both ends.
Flakes	46	Of these, eighteen have one surface consisting entirely of pebble cortex, and none of these eighteen have prepared striking platforms. Twenty-eight are struck from previously prepared cores, and have little or no cortex remaining on them. Five of the twenty-eight have prepared striking platforms. Many of both types have an angle between the striking platform and the flake surface which closely approaches 90 deg.
Straight and convex scrapers	24	Of these two are made on flakes whose upper surface consists entirely of cortex (Fig. 5, No. 4), two on pieces of tabular material, two on utilised tortoise cores, and the remaining eighteen on flakes struck from prepared cores (Fig. 5, Nos. 6 and 7). Eight, all in the last group, have prepared striking platforms, and the angle of flake surface and striking platform is similar to the flakes. The retouch is similar to that in Middle Stone Age collections previously discussed, and quite distinct from that

		of the Late Stone Age. The majority have the working edge on the distal end of the flake. Several in this group and the next are strongly suggestive of the re-edged scrapers of Bhera Ghat, although none are worked down so consistently.
Hollow scrapers	10	All are made on flakes, some of which have small areas of cortex remaining, and two have prepared striking platforms (Fig. 6, No. 5).
Nosed or double hollow scrapers	7	In each of these the two hollows are divided by a nose or beak, and in two cases these are of considerable length (Fig. 6, Nos. 1, 3 and 4), although evidently broken.
Triangulate scraper	1	This is a curious tool flaked all over both surfaces, resembling a hollow-sided triangle in outline, and with signs of use all round the edge but particularly in the most deeply indented hollow (Fig. 6, No. 2).
Discoids	3	They are of various sizes, and show signs of use, possibly as chopping tools (Fig. 5, No. 2).
Choppers	8	All are made on pebbles, and they vary greatly in size (Fig. 5, No. 1).
Tortoise cores	4	From two of them flakes have been struck (Fig. 5, No. 5), and two are unstruck (Fig. 5, No. 3).

At this site, as at Pandav Falls, only the prepared core technique is seen, and the blade-flake technique which appeared beside it on the Narmada is entirely absent. Scrapers on the distal ends of flakes are fairly frequent, but, although a few show signs of it, there is much less evidence here of re-edging on these tools than on those at Bhera Ghat. This is no doubt accounted for by the fact that this is a factory site. The evidence suggests that most of the tools would be taken away and actually used, and therefore reshaped elsewhere. In this respect it differs from Pandav Falls, where many more of the tools appear to have been used on the site.

The majority of the tools are made on nodules of chalcedonic silica many of which have clearly come from the river. In many cases, such as in the preparation of chopping tools and tortoise cores, the cortex has been left on the less essential parts of the object. Considering the flakes and scrapers as a whole we see that a considerable proportion, eighteen out of eighty-four, have the entire upper surface formed of cortex. Although all the eighteen show signs of use none has a prepared striking platform, and only two are retouched. These then must represent the first round of flakes knocked off nodules of raw material in the course of making tools. Among the twenty-eight flakes struck from prepared cores, but not retouched, five have prepared striking platforms. The highest proportion of flakes with prepared striking platforms, eight out of eighteen, is found among the flakes that have been struck from prepared cores and converted into straight and convex scrapers. This clearly indicates that while the first round of flakes removed from a nodule in the preparation of a core were frequently utilised and occasionally even retouched, it was the flakes which came from prepared cores, and even more those with prepared striking platforms, which their makers generally considered worth careful

secondary work. Although this appears almost too obvious to be worth stating, it none the less suggests the relative values set upon the tools by their makers, and also illustrates their practical and, one might almost say non-typological, attitude towards them. The same might be said of the cores, discoids and chopping tools. These groups grade into one another and overlap considerably, and it is clear that while certain specialised types were constantly made, much which fell short of the highest standard, or did not conform to any of these types, was used, and even the most specialised types probably served a multitude of purposes. These observations are borne out by ethnographic accounts of the aborigines of Central Australia.[8] The stone tools used by these people half a century ago resembled in many respects those of Indian Middle Stone Age industries such as we have been discussing. The parallel is not an exact one, but if used with circumspection it does provide a means of interpreting certain aspects of these industries.

Site III

As already pointed out the majority of the Middle Stone Age tools from Site III are made of jasper, and the Late Stone Age tools of a variety of kinds of chalcedonic silica, a great deal of the raw material in both cases having been in the form of river pebbles. The tools may be classified as follows:

Hammer stones	2	These are both ovoid river-worn pebbles, one of quartz and one of quartzite, and both show signs of use.
Flakes	36	All of these have plain striking platforms, and the majority show signs of use. The size and general condition suggests that they are not so ancient as the tools from Site II, but whether they are to be associated with Site I or not is impossible to say.
Blades	12	With one exception they are all almost complete, and heavily used. All are typical Late Stone Age blades.
Truncated blade	1	Also typically Late Stone Age.
Straight and convex scrapers	20	Of these all are made on flakes, four with prepared striking platforms, and the remainder plain. As a group they are much smaller than the scrapers from Site II. The scraper edges are sometimes on the sides and sometimes on the distal ends of the flakes, but the distinctive re-edged examples are no more marked, nor more common than at Site II.
Hollow scrapers	3	All are made on flakes with plane platforms and, as with the previous type, they are smaller as a group than those from Site II.
Chopping tools or discoids	5	Once more these are smaller, taken as a group, than those at Site II, and indeed the two smallest are not unlike Late Stone Age discoids.
Lunates	4	Two of these are large and two small, and while the latter are typically Late Stone Age, the former are not only larger in outline but also proportionately thicker in section, as a result of being made on com-

[8] B. Allchin, 'Australian Stone Industries, Past and Present', *Jr. Roy. Anthrop. Inst.*, **87**, Part I (1957), pp. 115–36.

		paratively large flakes or blade-flakes. They closely resemble the Australian *Eloura* (see p. 35).
Blade cores	7	These are all typically Late Stone Age. Two are broken and the rest complete.

It is clear that we have here at least two elements. Firstly there are tools which undoubtedly belong to the Late Stone Age group, that is to say the blades, blade cores and small lunates, and possibly also some of the flakes and the two smallest discoids. Secondly there are tools technically resembling those from the Middle Stone Age site which, however, when taken as a group, are considerably smaller than those at Site II. They are made almost exclusively of jasper, a material from which only a small proportion of tools at the latter site are made, and are patinated to varying degrees, but generally much less heavily than any tools at Site II, with the exception of those made of jasper which we have already mentioned. The two larger lunates may be included with the Middle Stone Age tools, as they are made not on the slender blades typical of the Late Stone Age, but on thick flakes or blade-flakes clearly produced by Middle Stone Age techniques. They closely resemble the *eloura*, or segmental adze-blade of eastern Australia.

Kondapur

The site of the Satavahana town of Kondapur lies about 40 miles west of Hyderabad City in Andhra Pradesh. A small museum has been built on a granite ridge overlooking the city site, and within 100 yards of the museum lie both a Late and a Middle Stone Age factory site. As at Krishna Bridge the former, which I have described elsewhere,[9] is situated on a prominent spur, while the latter, which was found by my husband, Dr. F. R. Allchin, lies in a hollow immediately below it. As at Krishna Bridge there were two main centres of concentration, one of Middle Stone Age and one of Late Stone Age tools, and also as at Krishna Bridge the typological difference was paralleled by a difference of patination. The Middle Stone Age tools were heavily patinated, and those belonging to the Late Stone Age scarcely at all. It has been unfortunately impossible to make more than a preliminary analysis of this collection, and consequently equally impossible to make any assessment of the relationship between the two industries. None the less I include the preliminary classification here for what it is worth.

The Middle Stone Age tools are all heavily patinated to a yellowish brown, some rather more than others. As far as can be seen the raw material when it is fresh is a greyish chert, sometimes mottled brown or black. Both raw material and workmanship are of poor quality when compared to the Krishna Bridge collection.

Preliminary classification of the tools:

Hammer stones	1	This is a quartz pebble, battered at both ends.
Flakes and scrapers	100	(approx.). These include both flakes and blade-flakes, and a small proportion in each group have prepared striking platforms. A small

9 B. Allchin and Satyanaryan, 'A Microlithic Site near Kondapur Museum', *Man*, No. 310 (1959).

proportion also have been turned into scrapers of various kinds, including some on the distal ends of flakes with slight indications of re-edging, although not nearly so marked as at Bhera Ghat.

Keeled scrapers	2	
Triangulate scraper	1	This is almost identical with that from Krishna Bridge (Fig. 6, No. 2).
Discoids	7	All of them are fairly small.
Cores	23	Of these eleven are discoidal cores, all of which are small by comparison with those in the Krishna Bridge and Bhera Ghat collections. They give the impression of having had several flakes struck off after successive processes of preparation, and thus worked down to the last possible degree. Many have also clearly been utilised as chopping tools, *tula* adze-blades (see p. 35) or scrapers in addition. The remaining twelve are of the blade-flake type similar to those found at Bhera Ghat, but again somewhat smaller, and frequently utilised as chopping tools.

In addition there are fifty-seven blades, blade cores and geometric forms all clearly belonging to the Late Stone Age group, both typologically and in terms of patination.

The most striking feature of this site is the close parallel it provides for Krishna Bridge. The relative positions of the Late and Middle Stone Age factory sites in both cases are almost identical. Another important point is that both the prepared core technique and the blade-flake technique are present at the same factory site. In fact this is the only one of the three main factory sites discussed at which both were present. At both Krishna Bridge and Pandav Falls only the prepared core technique is represented. The small size of the cores, and particularly the discoidal cores, when compared to those from Krishna Bridge or Pandav Falls, where only the prepared core technique is represented, when taken in conjunction with the presence of the blade-flake technique, might indicate a somewhat later date for this site. But when we consider that both techniques are represented in the cemented gravels at Bhera Ghat by cores quite as large as those at the two former sites, this seems unlikely. Further, many of the flakes struck from prepared cores at this site are also of a comparably large size, which seems to indicate that the small size of the cores is due to their having been prepared and struck repeatedly. This was probably on account of the scarcity and poor quality of the raw material, rather than a deliberate attempt to produce small tools. The matter must remain in doubt, however, until some more definite evidence of the relative ages of these two Indian Middle Stone Age techniques is obtained.

Conclusions

The evidence from Bhera Ghat and the other sites clearly makes possible certain tentative generalisations about the Indian Middle Stone Age industries found there, and, when this is considered in relation to that from sites described by other writers, it becomes clear that we are now in a position to amplify considerably the definition of the Indian Middle Stone Age put forward by Subbarao. Naturally such generalisations are

hypothetical, but without a working hypothesis no study can advance, and even if it proves to be incorrect such a hypothesis provides a summary of the evidence available at a particular point in time. It appears to me that we are now justified in making certain general statements regarding the technology, the relative dating, and the distribution of these industries.

Technology

There are certain very marked technological and typological factors which are common to all the Indian Middle Stone Age industries so far described, certain of which also distinguish them from comparable industries elsewhere. The choppers and chopping tools which so often accompany the hand-axe industries particularly in the northern part of the sub-continent,[10] form a more distinct and a larger part of the Indian Early Stone Age industries than is the case either in Europe or Africa. These same tools continue as an integral part of the Middle Stone Age industries, and like so many other tools they tend to grow smaller with time. The prepared core technique is another constant factor in the Middle Stone Age industries, as is the preparation of the striking platform which so often accompanies it. The blade-flake technique which we have already described in some detail (p. 8) sometimes, but not always, occurs alongside it. The relationship of these two techniques in the early part of the Middle Stone Age is not clear, but later they seem to become united as part of a single tradition. It is worth pointing out once more that the blade-flake technique of the Middle Stone Age is quite distinct from the blade technique of the Late Stone Age. Not only are the size and proportions of the blade-flakes and blades entirely different, but the size of the bulbs of percussion and the depth of the flake scars are much greater in the former case than the latter, indicating a completely different method of applying the blow. Exactly what the methods used in both cases may have been it is impossible to say, but the difference is comparable to the difference between flakes struck off by a direct blow with a wooden hammer, and those removed by an indirect blow applied by means of a pointed bone or hard-wood punch.

A remarkable feature of all these industries is the apparent absence of any well-defined type of point. The small hand-axes present in the earliest phases later drop out, but they are not replaced as in the Mousterian and Upper Palaeolithic of Europe, or in the Middle Stone Age of Africa, by stone points. Such points as do occur are so crude and ill-defined as to appear almost fortuitous. Bone points have never been recorded as accompanying these industries, so we are left with hard-wood as the only alternative for spears or arrows.

Burins are also conspicuous by their absence, but this may be accounted for in terms of environment, as the burin is essentially a tool for manufacturing the needles and awls which are needed to make heavy clothing in cold climates.[11]

[10] B. B. Lal, 'Palaeoliths from the Beas and Banganga Valleys, Panjab', *Ancient India*, **12** (1956), pp. 58–92.

[11] J. G. D. Clark and M. W. Thompson, 'The Groove and Splinter Technique of Working Antler in Upper Palaeolithic and Mesolithic Europe', *Proc. Prehist. Soc.* (N.S.), **19**, No. 6 (1953), pp. 148–60.

By far the commonest tool of these industries is the scraper, with either a convex or a concave working edge, and made on the side or end, or both, of a flake, or a blade-flake, or simply on a piece of raw material. The retouch varies in quality, but never approaches the delicacy of that found in the Late Stone Age. A related type, which is highly characteristic of these industries, though less numerous than the scraper, is the awl. This occurs in a whole range of sizes, and is frequently made in conjunction with a double hollow scraper. The awl-point, or beak as it is often called, has been formed by the same operation as that which forms the hollow scrapers, that is by the flaking back of the edge in two places.

There are indications at various stages that scraper edges which became battered and irregular in use were reworked, some many times. Certain of the later variants of the industry seem to have added more specialised types to their range, but these we shall discuss below. The predominance of scrapers, when taken in conjunction with the distribution of the industry, in western India at least, in the higher rainfall areas, has already been taken by Malik to indicate that these are woodland industries, and the scrapers wood-working tools. This complements the lack of stone points, and together these facts make a strong case for the use of spears or arrows entirely made of wood. The size of the hollow scrapers suggests spears rather than arrows, at least in the earlier stages.

Before going on to discuss its variants in different parts of the sub-continent, we must summarise the evidence for the dating of the Indian Middle Stone Age as a whole, and its distribution as so far known.

Dating

We have seen that on the middle and upper reaches of the Narmada industries of Middle Stone Age type have been found associated with the second of two major phases of aggradation. The same appears to be true of the Pravara,[12] a tributary of the Godaveri, also on the north-western Deccan plateau. In the Bombay area Middle Stone Age industries are also associated with the second of two major phases of Pleistocene aggradation. Although these phases of aggradation on the Deccan plateau, and the coastal plain, are probably due to somewhat different causes, and may therefore not correspond exactly in time with one another, the fact that in each case the earlier phase of aggradation is associated with a hand-axe industry and the later with a Middle Stone Age industry suggests a certain degree of parallelism.

There is no doubt that stratigraphically, as well as typologically, the Middle Stone Age industries follow those of the Early Stone Age; nor, for that matter, that they are in turn followed by the industries of the Late Stone Age which are found above deposits of the second aggradation phase. Indeed, as we have already seen, on the middle and upper Narmada Middle Stone Age industries occur throughout the deposits of the second aggradation phase, and even in those which immediately over-lie it. This represents a

[12] H. D. Sankalia, 'Animal Fossils and Palaeolithic Industries from the Pravara Basin at Nevasa, District Ahmadnagar', *Ancient India*, **12** (1956).

very considerable period of time, during which changes and developments took place, but the essential characteristics of the industry were maintained. The term Indian Middle Stone Age therefore is a wide one, and includes considerable temporal and typological variations. The evidence at present available appears to indicate that it spans the period of the second aggradation phase, on the north-western Deccan plateau at least, rather than that it is contained by it. Industries which fall typologically within the Middle Stone Age tradition are found widely distributed throughout the Indian sub-continent.

Distribution

In western India the Middle Stone Age industries appear to be limited to the areas of higher rainfall, for while they are present in deposits of the second aggradation phase in Bombay, they have not been recorded in any of the corresponding deposits which have been studied[13] on the lower Narmada, and further north on the Gujerat plain; nor have they been recorded on the surface in these regions. It seems therefore that their distribution was, in fact, limited by the Sind desert and adjoining regions of low rainfall.

In the north-east less research has been done, but, so far at any rate, no Middle Stone Age tools have been recorded in the Gangetic plains, or the eastern Himalayan foot-hills. The edge of the Gangetic plains in fact seems to form the limit of their distribution in this direction. In this connection the site at Rehuntiya is interesting, being the nearest recorded site as far as I know to the Ganges alluvium. Many sites have been found in the hills and forests of Central India, and the most easterly of these so far recorded is in river gravels in the Singarauli basin in Mirzapur district.[14] But there seems no reason to suppose that Middle Stone Age industries should not be found further east if a systematic search were made.

It is in the north-west, in the western Himalayan foot-hills that, as throughout the course of Indian history, connections with the outside world are to be sought. de Terra and Patterson have pointed out that certain flake tools from the Narmada are comparable to Late Soan tools from northern Pakistan, as defined by them. We are now in a position to reverse this, and say that the Late Soan falls typologically within the range of the Indian Middle Stone Age. de Terra and Patterson go further, and claim that the deposits which contain the Late Soan tools are contemporary with the second aggradation phase on the Narmada. The question of their relationship is a difficult one, as the two deposits were laid down in quite distinct environmental regions, one north and the other south of the desert belt. None the less the typological comparison is, in my opinion, a valid one, and in itself implies contemporaneity. Thus the Late Soan extends the distribution of the Indian Middle Stone Age north of the desert belt, into the southern foot-hills of the Central Asian Massif. This becomes very suggestive when one considers that a number of comparatively short routes via the foot-hills, valleys and passes of Afghanistan separate

[13] F. E. Zeuner, 'Stone Age and Pleistocene Chronology in Gujerat', *Deccan College Mon. Series*, No. 6 (Poona, 1950).

[14] V. D. Krishnaswami and K. V. Soundarajan, 'The Lithic Tool Industries of the Singarauli Basin', *Ancient India*, **7** (1951), pp. 40–66.

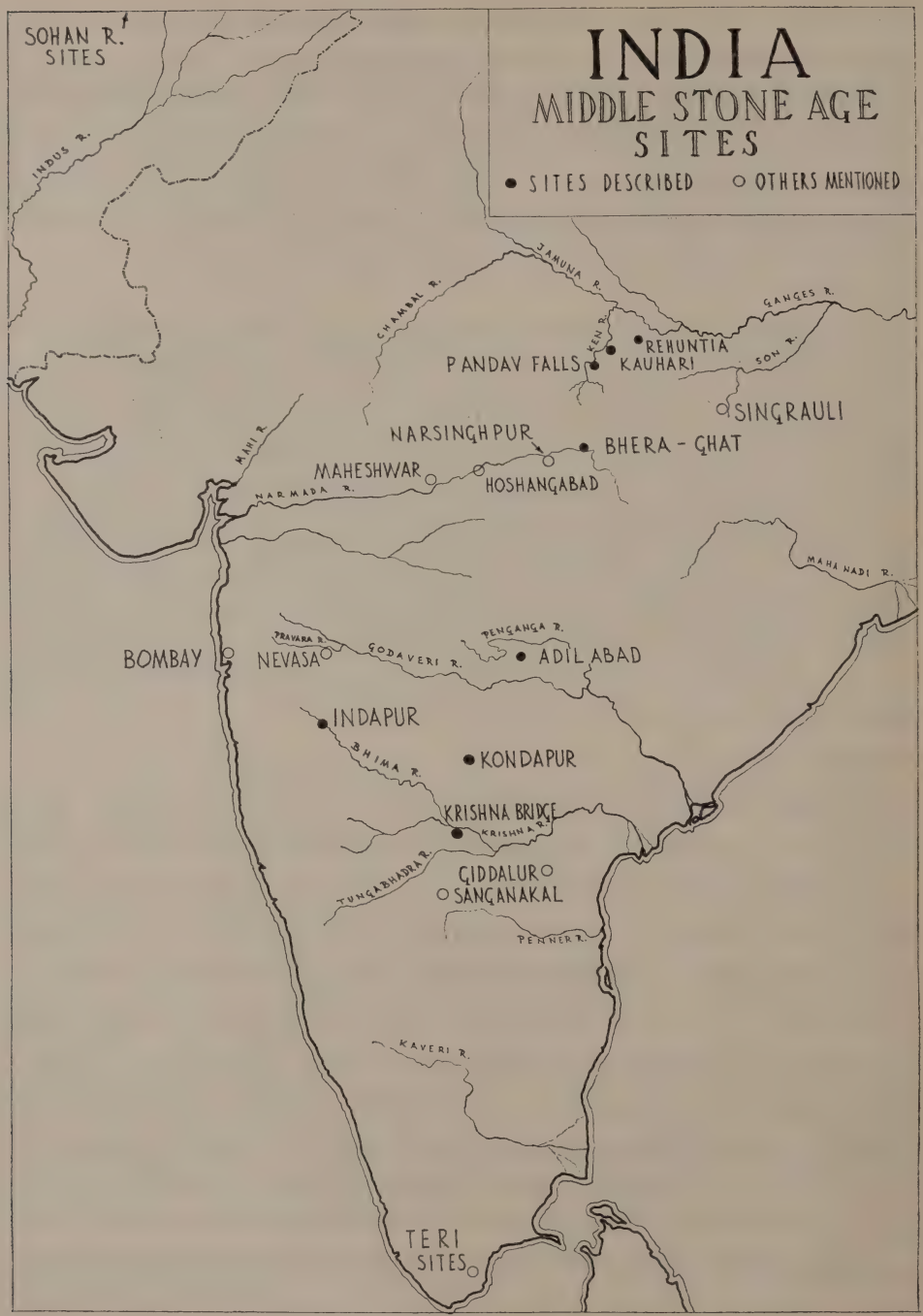


Fig. 7. Map of main sites

the sites of the Soan river and the upper Indus at which the Late Soan industry is found, from Mousterian sites, which occupy corresponding positions on the north-western fringe of the same massif, in the Oxus valley and eastern Iran.[15] [16] [17] This whole question, however, requires a great deal more research and field work, both archaeological and geochronological.

On the central plateau of peninsular India we have already seen that Middle Stone Age tools, closely similar to those of Central India, were made on the banks of the Krishna, only twelve miles north of Raichur. The heavily patinated flake tools found by Dr. Subbarao at Sangankal in Bellary district probably also fall within the general Middle Stone Age group of industries,[18] and extend their distribution over 100 miles further south. Cammiade's finds further extend it eastward to the edge of the Deccan plateau in Andhra Pradesh. There he found stone age sites of all periods including Middle Stone Age along the line of the Eastern Ghats.[19] These sites include several in the neighbourhood of Giddalur, in Kurnool district, which were later visited and described by Soundara Raja.[20] Tools described and illustrated by him confirm the presence of Middle Stone Age industries in this area, but all appear to be derived, and therefore it is impossible to know whether a series of Middle Stone Age industries are represented, or only one.

Tools found by Cammiade[21] at surface sites on the hills overlooking the lower Godavari also appear to be a late local development of the Middle Stone Age, which we shall discuss below.

Along the western coastal plain, south of Bombay, no Middle Stone Age tools have been reported, but, as in eastern Central India, there seems no reason to suppose that they would not be found if a systematic search were made. Throughout this region conditions are very similar to those of Bombay.

Middle Stone Age tools appear to have been absent from the Malbrabha basin in the south-western Deccan[22] but a small collection of typical Middle Stone Age flakes and scrapers was made by the present writer from the gravels of the River Bhima above the bridge on the main road near Indapur.

Finally the earliest phase of the Teri industry of the extreme south-east coast[23] extends the Middle Stone Age tradition down on to the eastern coastal plain, and almost to the extreme end of the peninsula.

[15] A. P. Okladnikov, Papers of the Institute for Scientific Research, Moscow (translated as a Critical Digest by H. A. L. Movius, *Amer. School Prehistoric Res. Bull.* No. 17, 1953), (1949).

[16] F. R. Allchin, 'A Flake Tool from the Oxus', *Proc. Prehist. Soc.* (N.S.), **19** (1953), p. 227.

[17] C. S. Coon, 'Cave Explorations in Iran 1949', *Mus. Mon. Univ. Mus. Pennsylvania* (Philadelphia, 1951)

[18] B. Subbarao, 'Stone Age Cultures of Bellary', *Deccan College Dissertation Series*, No. 7 (Poona, 1949).

[19] L. A. Cammiade and M. C. Burkitt, *loc. cit.* (1930).

[20] K. V. Soundara Rajan, 'Stone Industries near Giddalur, District Kurnool', *Ancient India*, **8** (1952), pp. 64–92.

[21] L. A. Cammiade, 'Pigmy Implements of the Lower Godavari', *Man in India*, **4** (1924), pp. 83–105.

[22] R. V. Joshi, 'Pleistocene Studies in the Malprabha Basin', *Deccan Coll. Publ.* (Poona, 1955).

[23] F. E. Zeuner and B. Allchin, 'The Microlithic Sites of Tinnevelly District, Madras State', *Ancient India*, **12** (1956), pp. 4–20.

Late Variants

The later phase of the Teri industry together with the Late Stone Age industry of Ceylon[24] represents a very peculiar late development of the Indian Middle Stone Age tradition. In these industries quartz is used almost exclusively, although other more tractable raw materials appear to have been available. Perhaps on this account the finer points of the prepared core technique appear to have been largely abandoned. Tools were still made on flakes, however, and these include not only scrapers of various kinds, some of which might almost be miniature versions of the Middle Stone Age tools from further north, but also geometric microliths, asymmetrical points, and extremely delicately worked bifacial points. Occasional attempts to produce parallel-sided blades are also found, but this appears to be a persistence of the Middle Stone Age blade-flake technique, and in any case is extremely rare. In many respects the Late Stone Age industries of southern Mysore are transitional between the Upper Teri industry and the Late Stone Age industries of northern India. The latter are characterised by the production of extremely fine parallel-sided blades, and geometric tools which are invariably made on sections of these blades. Almost the only raw material employed is chalcedonic silica of various kinds, and quartz is very rarely used. Bifacially-worked tools of any kind are completely absent. In southern Mysore bifacial tools are still absent, but quartz is the most frequent raw material. An attempt is made to produce blades, and these are more frequent than in the Teri industry, or in the Late Stone Age of Ceylon, but neither so frequent nor so fine as further north.

There are indications that quartz may have been employed more frequently in eastern Central India, in Late Stone Age times, for the industry from Bala Nadi in the Singarauli basin was made almost exclusively of quartz, and small collections of Late Stone Age tools, more than half of which were made of quartz, were made by the present writer at sites in the Ranchi district of south Bihar. These examples make the choice of quartz more inexplicable, for while in the extreme south and in Ceylon many of the sites lie in predominantly granite regions, where quartz is the most plentiful, though not the only raw material available, in Mirzapur and Ranchi districts many forms of chalcedonic silica, and other rocks with a regular concoidal fracture, are available in as large or larger quantities than quartz.

The tools described by Cammiade from the lower Godavari region, between the Deccan plateau and the river delta, also seem to be the result of a local fusion of Middle and Late Stone Age techniques. Unfortunately his article has no illustrations, but many of the flake tools he describes as being found at 'caves' alongside geometric microliths, and apparently contemporary with them, are quite unlike those found with microliths elsewhere in India, except possibly at the Teri sites. The tools from the lower Godavari however were evidently made largely of chert, and quartz is not mentioned as a raw material. This last observation is borne out by the extremely small collections that are available in

[24] B. Allchin, 'The Late Stone Age of Ceylon', *Jr. Roy. Anthrop. Inst.*, **89**, Part 1 (1959).

this country. It is possible that the flake tools may belong to an earlier industry; a question which only further visits to the sites listed by Cammiade could settle. He compares some of the tools to the *tula* adze-blades employed by Australian aborigines, and his descriptions conform very closely to those of Australian archaeologists who have written since his time.[25] It is all the more remarkable therefore that this comparison should have occurred to Cammiade as early as 1924, at which time he would have had nothing but the writings of ethnologists such as Spencer and Gillen, and Sollas's monumental *Ancient Hunters* to guide him. The *tula* is generally made on a flake, which if it were found in a European context would almost certainly be classed as a scraper. The working edge is almost always retouched, often steeply, and may be concave, straight, convex, beaked or gouge-like. It is frequently re-edged, and many examples are worked down to less than half the original size by this means (Fig. 1, No. 8). The *tula* adze blade is almost always mounted in gum on the end of a wooden shaft and used for chopping, gouging and wood-working generally. It is the tool with which the shields, spears, dishes and boomerangs of the Australian aborigines are generally made. The *eloura* is a roughly segmental variant of the *tula*, resembling a large thick lunate. It seems reasonably probable that this is how many Indian Middle Stone Age scrapers were used. The aborigines of Central Australia indeed provide ethnographic parallels for much that we see in the Indian Middle Stone Age, the spear being their principal weapon, and the *tula* or *eloura* adze their most important tool. It must be borne in mind however that they have adapted themselves to a highly specialised desert environment. The closest parallel, in terms of environment and stone technology, is provided by the Middle Stone Age industries of Africa, south of the Sahara.

Summary

The Indian Middle Stone Age tradition appears to have developed out of the Early Stone Age of the sub-continent, which already combined the features of both hand-axe and chopping-tool traditions. It seems quite possible that, in the early stages at any rate, it was in contact with comparable industries in Central Asia. Subsequently the Indian Middle Stone Age industries appear to have developed in comparative isolation in the regions south-east of the Sind desert for a long period, probably corresponding to the duration of the second aggradation phase on the middle and upper Narmada. At the end of this time a highly developed microlithic blade industry makes its appearance in Gujerat and western Central India, which seems to replace rather than modify the late Middle Stone Age industries. In the extreme south, the south-east, and possibly in eastern Central India, this microlithic blade industry appears to have modified the existing industries, which adopted certain, but not all, of the Late Stone Age techniques, and also developed various local peculiarities. These probably existed side by side with the north-western Late Stone Age industries, and possibly also side by side with the earlier phase of the Deccan Neolithic.

[25] F. D. McCarthy, 'The Stone Implements of Australia', *Aust. Mus., Sydney*, Mem. 9 (1946).

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On the Origin of the Cinder Mounds of the Bellary District, India*

By F. E. Zeuner

The mounds of scoriaceous ash found in the area around Bellary[1] have caused much speculation. Owing to their often strikingly white colour and sparse vegetation they attracted the attention of the present population, and there are legends describing them as the funeral pyres of giants or saints. Evidently they are regarded as structures of the distant past by the present inhabitants. No wonder that archaeologists began to study them well over a hundred years ago. Newbold[2] was the first to report on them in 1836.

According to shape, Bruce Foote[3] distinguished 'cinder camps', supposedly inhabited, from 'cinder mounds', mere slag and ash heaps. But Sir Leonard Woolley[4] and others have pointed out that originally conical mounds are likely to have been converted into circular walls with a central depression by the quarrying of ashes by modern villagers who use the material for their roofs. Another frequent use is for white-wash.

As to the age of the mounds, two views have been prevalent. The first, strongly defended by Bruce Foote, associates them with the so-called Neolithic polished-axe culture which, however, is at Brahmagiri as late as the first millennium B.C. according to Sir Mortimer Wheeler. The alternative view assigns to them an even later age on the evidence of wheel-made pottery, assuming that the earlier specimens are intrusive. A systematic study of the chronological problem by Dr. R. Allchin[5] has recently proved that the Neolithic age of the ash-mounds is almost certain, and this is supported by the fact that in Gulbarga District a stone circle is superimposed on an ash-mound.

Another problem, however, is that of the material composing the mounds. Microscopic examination, chemical analyses and melting-point determinations have been carried out following the writer's visit to the sites of Kudatini (Budikanama), Gadiganur and Kupgal in 1949, when samples were collected. In addition, Dr. Allchin supplied a

* This is Report No. 6 of the Indian Geochronological Expedition, 1949.

[1] R. Sewell, 'The Cinder Mounds of Bellary', *J.R. As. Soc.*, 1899, pp. 1–16.

[2] T. J. Newbold, 'Note on the occurrence of volcanic scoria in the Southern Peninsula', *J. As. Soc. Bengal* **5** (1836), pp. 670–1.

[3] R. B. Foote, *Indian Prehistoric and Protohistoric Antiquities* (Madras, 1916), pp. 89–95.

[4] L. Woolley, 'Some aspects and problems of Indian Archaeology', *J. R. Soc. Arts* (1940), p. 191.

[5] R. Allchin, 'The Development of Early Cultures in the Raichur District of Hyderabad', Ph.D. Thesis, London (1954), pp. 402–17.

specimen from Piklihal, in the Raichur District. The present paper is a report on the findings concerning these specimens.

Origin of the slag or ash

A surprising variety of suggestions has been made to explain the curious vitreous slag that abounds in these mounds. The writer has noticed the following:

(*a*) Volcanic ash.

(*b*) Travertine formed by calcareous springs.

(*c*) Cremation grounds, including suttee.

(*d*) Burnt cow-dung.

(*e*) Glass slag.

(*f*) Metallurgical slag.

The idea of *volcanic ash*[6] is less absurd than appears at first sight, for the resemblance of the cinder beds to pumice beds of a volcano is close indeed. There is, however, no volcanic activity to which these slags could be attributed, the period of formation of the Trap rocks being early Tertiary, and the Trap being chemically quite different from the cinder. That the beds should have been formed by *calcareous springs*, however, is a misinterpretation based on superficial knowledge. The slag as such is siliceous, not calcareous, and its resemblance to kunkar (calcareous concretions found in the soil) is superficial.

It sufficed, however, to induce the makers of graves in Raichur District to substitute kunkar for slag, the genuine article. The use of curious stones, particularly slag, on graves is not uncommon. Apart from the examples at Raichur, India, I am familiar with their use in the Ötztal, a valley in the central Alps of Austria, where a volcanic explosion of Pleistocene age had produced a large quantity of pumice. There the pumice is used also for the adornment of saints' shrines. The most modern example is, incidentally, the use of crushed industrial slag on graves in London cemeteries. It is mainly of the green variety, and the relatives of the deceased are I suppose unaware of the origin of the material. The association of lumps of slag with graves, therefore, has nothing to do with the concept of cremation of the body, it is merely a case of using a kind of 'stone' of an unusual appearance.

The hypothesis that the slag mounds are ancient *cremation grounds*,[7] the slag having been formed by the heat of the cremation, both from ash and soil matter, has often been taken seriously. Though the large size of some of the mounds would imply an enormous number of cremations, it has to be examined with care. Quite apart from the virtual absence of human bones from the heaps, the phosphate content of the cinder is the same as that of cow-dung ash. It would be higher if much bony matter was incorporated.

[6] T. J. Newbold, *op. cit.*, f.n. 2 above.

[7] J. J. Modi, 'Recently Discovered Ash-Mounds in Raichur District', *Anthr. Soc. Bombay*, **14** (1931), p. 7.

Moreover, where the mound material is stratified, layers of different constitution cover large areas, which is difficult to explain by the hypothesis of individual cremation. That the cinder mound at Nimbapuram near Vijayanagar was either a suttee ground or else one where those slain in battle were cremated has been suggested by Longhurst,[8] but both the size of the mounds and their geographical restriction contradict this idea. Local tradition has it that this mound contains the ashes of a mythical being called Bali.[9]

The most extraordinary suggestion was made by Bruce Foote,[10] who suspected that the material composing the heaps is *burnt cow-dung*. He substantiated it by referring to Sir Henry Stanley's *In Darkest Africa*, where the practice of piling up great circular mounds of cow-dung inside the thorn fence surrounding villages on the Albert Nyanza is described. If such fence was fired either on purpose or accidentally, ash of a scoriaceous nature would be produced. At this point it became evident why Bruce Foote laid such stress on the existence of cinder 'camps' as distinct from the mounds.

Mounds of cow-dung, however, are still being built. F. Balsan[11] figures large cow-dung heaps erected in the neighbourhood of villages in Kurdistan. I have in vain tried to obtain more precise information from the author. It may be legitimate to guess that they are intended as fuel. If they were set on fire, they would produce ash or cinder mounds much like those found in India.

The causes of the fires remain obscure, whether due to enemy activity or accident, or even spontaneous combustion, and since the shape of the accumulation is not a decisive argument, the problem is whether the material composing the cinder is derived from cow-dung or not. This will be discussed in due course.

There remains to be mentioned the possibility of the scoriae being industrial slag. The suggestion that they are *slag from ancient glass works* is feasible, since they are composed of over 50 per cent silica with considerable amounts of alkali. But glass works could hardly produce such large heaps of cinder without some of the rejected products being incorporated. Nothing of this sort has so far been found anywhere.

Finally, it was suggested at one time by Munn,[12] but later withdrawn, that the slag is of metallurgical origin. If the metal concerned was one of the commoner ones, it would be found in the slag in quantity. Only one of the Wandalli samples had as much as 17 per cent of iron (Fe_2O_3), which is very exceptional. If connected with gold workings, as at Wandalli (Raichur district), the quantity of metal may be very small. But there are many other mounds which are in no way connected with gold mines or any other.

[8] A. H. Longhurst, *Hampi Ruins* (3rd ed., Delhi, 1933).

[9] T. J. Newbold, 'On some ancient mounds of scorious ashes in South India', *J.R. As. Soc.*, **7** (1943), pp. 129–36.

[10] R. B. Foote, *op. cit.*, f.n. 3 above.

[11] F. Balsan, *The Sheep and the Chevrolet, a journey through Kurdistan* (London, Elek, 1947).

[12] L. Munn, 'Artifacts and fossil bones from the Godavery Valley', *Rep. Hyderabad archaeol. Dept.*, App. C. (1928), pp. 27–9.

L. Munn, 'Geology of the Western Portion of Raichur,' *J. Hyderabad geol. Surv.*, **2**(1) (1934), pp. 121–34.

L. Munn, 'Prehistoric and Protohistoric finds of the Raichur District', *Man in India*, **15**(4) (1935), pp. 225–50.

L. Munn, 'Geology of the Eastern Portion of Raichur', *J. Hyderabad geol. Surv.*, **3**(1) (1936), pp. 77–82.

The possibility remains that cow-dung was used as a fuel only for some industrial process which has not yet been established by evidence. This would merely be a variant of the cow-dung hypothesis which is to be discussed in the following paragraph.

Stratification of the deposits

Some of the heaps are of considerable dimensions, that at Wandalli measuring 100 by 60 metres and being 15 metres high. Many are smaller, however, including those called 'cinder camps'. That at Kupgal (No. 1) measures about 50 metres across. Some mounds in the Raichur District are of less than ten square metres.

The shape of the mounds varies: they may be round, oblong, or rectangular. Kupgal No. 1 is roughly square and, having a depression in the middle, is classified as a camp by Foote.

Stratification is often not obvious, namely, where the scoriae or slags are large, but the less coarse-grained components are often distinctly bedded. In many places, darker bands of fine-grained material occur; one of these from Kupgal No. 1 will be discussed later on. It is evident that the material was not heaped up and burnt on one occasion, but that there was a succession of such events.

It is also noteworthy that at Kupgal No. 1 only the periphery has been converted into vitreous slag, whilst the inner parts of the mound (or camp) are fine-grained and stratified.

Petrology of the cinders

Specimens were available from Kupgal No. 1 (Bellary), Kudatini (Budikanama Pass, Bellary, Plate I*a*), Gadiganur (Bellary, Plate I*b*), and Piklihal (Raichur).

The lumps of slag are similar in all essential respects. They are whitish or grey, with a green tinge, in places black or brown. Where fusion has been intense, large vesicles make up the body of the slag, and the separating walls are thin. With it goes glassy texture, often fluidal, and green tinge. When a lump is broken open, the internal colour is not infrequently black, due to the presence of varying amounts of unburnt organic matter. This suggests that insufficient oxygen was available in the centre of the slag, whilst on the outside, an excess of air was available. *A lump of combustible substance, therefore, which contained organic matter, must have been heated above fusion temperature.*

Many lumps are incompletely fused, portions being ashy and showing cracks much like those of burning charcoal, and there is much loose 'ash' incorporated in an irregular fashion. The cracking suggests loss of a volatile substance (as do the vesicles), probably derived from the organic material originally contained. *The incomplete and patchy state of fusion indicates that the fusion temperature was not reached everywhere in the mound and the prevalence of ash over scoriae in many places that most of the mound never reached it.*

Inside certain specimens of slag, the transition to ordinary ash is observed. Here particles are seen under the microscope which are evidently derived from the original fuel. They are all small, of the order of a millimetre. There is no evidence of wood, even

of small pieces derived from twigs. All recognisably shaped fragments, however, do suggest remnants of vegetation, mainly of grass stalks and blades. In the specimens that I have been able to examine, there was nothing to suggest a substance as coarse as straw. Under the microscope half-fused ash from such patches is found to contain many small fragments of silica skeletons of grass cells (Plate II*a*, *b*). *It is therefore suggested that the fuel consisted of finely comminuted grass*, apart perhaps from other materials that cannot be recognised.

The three conclusions arrived at so far support the idea of Bruce Foote that the mounds consist of burnt cow-dung. Finely comminuted grass, in the form of lumps, which were partially fused by combustion from outside is difficult to explain otherwise.

Chemical analysis

Chemical analyses were therefore made of a specimen of green slag from Kudatini, and of fresh cow-dung ash. Two earlier chemical analyses from Wandalli (Raichur) are available and included in the table.

The specimens of cinder effervesce for a second or so on surfaces of powdery appearance, though not so on glassy ones. Calcium carbonate is therefore present as dust, and is an addition from outside. This is not surprising in the relatively dry Bellary and Raichur regions where most immature soils contain calcium carbonate, and sometimes plenty of it. For this reason, the cow-dung for our analyses was collected on the Chalk Downs of Berkshire, so as to have a sample from a calcareous subsoil.

The three analyses of cinder agree with modern cow-dung ash in consisting of almost 60 per cent of silica. Iron, aluminium and manganese oxides vary, *c.* 9 per cent in Kudatini and Wandalli (Foote) comparing with *c.* 22 per cent in Wandalli (Smith) and 18 per cent in modern cow-dung. This variation may be ascribed to varying amounts of iron. The alkali and earth-alkali contents, taken as a whole, vary but little, from 15.5 to 21 per cent, but the distribution of elements is irregular. Kudatani has very little calcium oxide, Wandalli has more, and the highest is found in modern English cow-dung from the Chalk Downs. Since Kudatini rests on gneiss, I am inclined to attribute the differences to the varying amounts of CaO available in the substratum. Correspondingly, potassium oxide is highest in Kudatini, where the gneiss contains orthoclase. The only other component worth considering is phosphorous pentoxide, present in appreciable quantities. There is more in the Kudatini sample than in those from Wandalli, but the mean of the slag values: 2·4 per cent, is virtually identical with modern cow-dung. One would expect it to be higher if cremation was the cause of the formation of the mounds.

Chemical analysis thus shows clearly that the slag could well be derived from cow-dung.

Melting point

Evidently, the melting of ash requires a fairly high temperature and this should be the same for the slag and for cow-dung if this latter material produced the former.

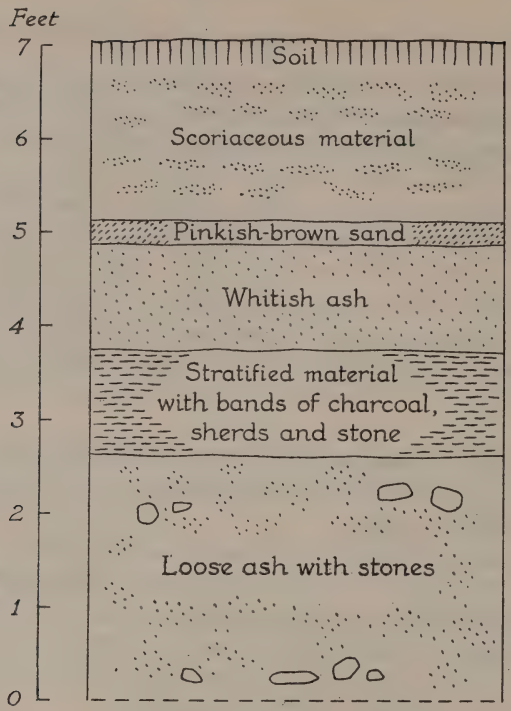


Fig. 1. Section in the Gaudur ash-mound, after Mann

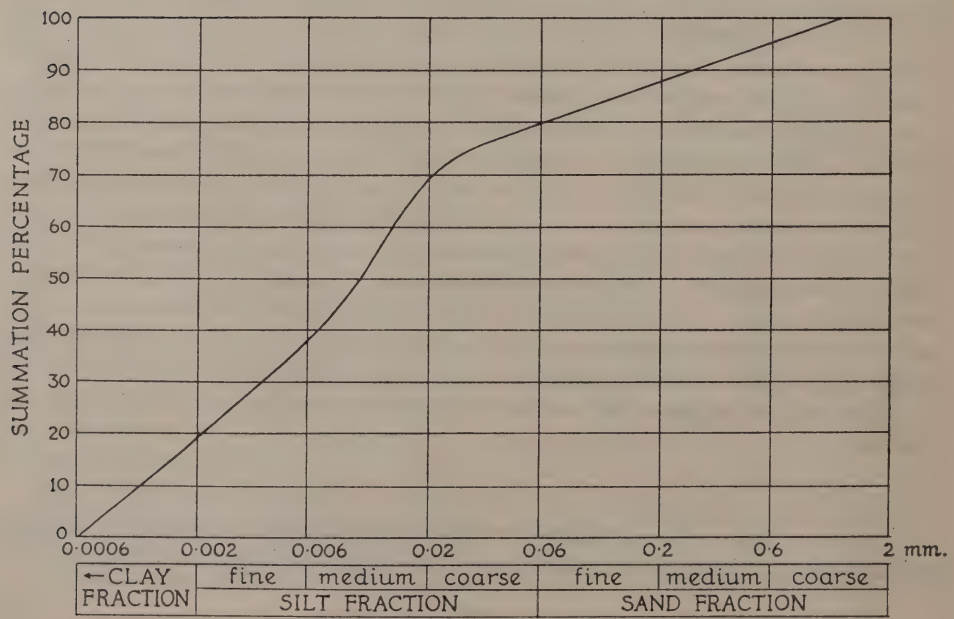


Fig. 2. Mechanical analysis of brown layer from Kupgal

Experiments were carried out at the Imperial Institute, comparing samples of our specimens with 'Seger cones' of known melting point. The first sample was of finely-ground slag from Kudatini, the second of modern, untreated cow-dung, and the third of ash of modern cow-dung. All three melted at the same temperature, approximately 1,200–1,230° C. This may appear to be very high, as some lavas are no hotter than this. It must be remembered, however, that in British vitrified forts similar temperatures must have been reached. Fairly dense packing of combustible material, still permitting a slow draught but avoiding heat-loss, is the prerequisite which was fulfilled both in the vitrified forts and in large heaps of cow-dung. That such large heaps are occasionally built at the present day is illustrated in Plate II*c*, already referred to.

It is likely therefore that on each occasion of burning the quantities involved were very large.

Intercalated layers

It has been mentioned above that cinder mounds are often stratified, and that layers occur containing stones, charcoal and sherds. They indicate that at times the heaps were cool and to some extent occupied. In addition, bands of brownish sandy material occur, as at Gaudur (Fig. 1) and at Kupgal. At the latter locality, the material suggested a soil. A mechanical analysis was made and showed (Fig. 2) a distinct concentration of the silt grade (60 per cent). The unsorted character of the remainder of the curve indicated that this was due to wind sorting; the mound must have been devoid of vegetation and exposed to wind for some time and, apparently, deserted by man. Whether weathering occurred also on some of these occasions, implying a cover of vegetation, we have been unable to ascertain.

Conclusion

To sum up, microscopic investigation, chemical analysis and melting-point determination are consistent with the cow-dung nature of the material of the mounds. They must have been of large size to sustain high temperatures while on fire. Burning occurred at intervals, and sedimentation was not continuous. There were times when the mounds were abandoned and exposed to wind, and others when human occupation material was added, possibly implying an occupation.

Whilst it appears safe to say that the mounds consisted of enormous quantities of cow-dung deliberately heaped up by man, the reasons for these concentrations remain unknown. They may have been economic (for instance fuel storage) or connected with religious ceremonies, though one hesitates to accept the second alternative without further evidence. The destruction of vast amounts of economically valuable material for religious purposes would require exceptional motives. In this connection, the Festival of Lights, or some predecessor of it, may be remembered, and the cow-dung worship described by Dubois.[13]

[13] J. A. Dubois, *Hindu Manners, Customs and Ceremonies* (3rd ed., 1906).

ACKNOWLEDGEMENTS

In conclusion I wish to express my thanks to Mr. V. D. Krishnaswami and Dr. B. Subbarao, who conducted me in the field, and to Dr. I. W. Cornwall for his help in the laboratory as well as for the microphotographs. Mr. Barrett of the Imperial College of Science and Technology kindly determined the melting points of samples of dung and ash. Dr. R. Allchin is preparing a report on the cinder mounds of the Raichur district and on the finds made in them and in the Bellary area, so that there is no need here to discuss the arguments that can be derived from such evidence. Dr. Allchin, however, has also substantially contributed to the present investigation by submitting samples from Piklihal near Raichur for investigation.

CHEMICAL ANALYSES OF SLAG FROM INDIAN CINDER SITES COMPARED WITH COW-DUNG ASH

	Kudatini	Wandalli W. E. Smith	Wandalli Bruce Foote	Cowdung ash England
SiO_2	67·40	53·10	66·19	56·31
Fe_2O_3 Al_2O_3 Mn_2O_3	9·47	17·27 4·51 — 21·78	8·19	little 17·57
CaO	4·38	10·89	15·88	17·56
MgO	2·98	3·89	less than 4·52	0·35
K_2O	6·24	1·11		1·54
Na_2O	1·9	2·54		1·68
CO_2	0·47	5·30	—	absent
ignition loss	2·82	—	3·39	—
H_2O at 100°C	—	0·20	0·26	—
Elem. C	—	—	—	1·01
P_2O_5	3·40	1·17	1·57	2·46
SO_3	absent	—	—	0·61
Cl	trace	—	—	0·07
undetermined	—	—	4·52	—
Total	99·07	99·98	100·00	99·16

The Cimmerian Problem

By Tadeusz Sulimirski

The earliest people in Eastern Europe whose name has come down to us are the Cimmerians. However, several controversial views have been expressed by most eminent scholars in respect of their ancient settlements, their date, etc. In this article I intend to review briefly the present state of research on the Cimmerians and make a few suggestions.

The Cimmerians

Homer (*Odyssey* XI, 14) mentions a people called the Cimmerians who lived in a mythical country of fog and darkness, situated somewhere on the confines of the inhabited lands, on the border of the Ocean, on the threshold of the nether world. Accounts by Herodotus (IV, 11–13) and other ancient authors are more precise in placing the ancient Cimmerians in the country north of the Black Sea and stating that they were forced by the Scythians to abandon their homeland and to retreat to Asia Minor. Many historians, and almost all archaeologists, accept these reports and connect the North Pontic Cimmerians with those known from Greek and Assyrian records in Asia Minor. Some scholars, however, regard the Asiatic Cimmerians as a people which had nothing in common with that in the north which bore the same, or a similar name,[1] or even deny that the Cimmerians ever lived in the North Pontic lands;[2] a few identify the Homeric Cimmerians with Celtic Cimbrians, seeking them in Cornwall,[3] Belgium,[4] Jutland,[5] or in Western Europe in general.[6]

E. H. Minns[7] rightly remarked that it does not seem probable that Herodotus simply invented the story of the Cimmerians coming from the north side of the Black Sea: they

[1] E.g. E. Meyer, *Zft. f. Vergl. Sprachforschung*, XLII, 11; Rhode, *Kl. Schr.*, I, 93; W. Tomaschek, 'Kritik d. ältesten Nachrichten über den skythischen Norden'. *Sitzingsberichte d.K. Akademie, Wien*, 1888, v. 116, 778; Müllenhoff, *Deutsche Altertumskunde*, III.

[2] Summarised by M. Antonovych, who is of the same opinion, in 'Čy buly Kimmeriitsi v Ukraini?' *Ukrainskyi Morskyi Instytut* (Odessa-Herzfeld, 1946).

[3] R. Henning, 'Die Frage des Lastrygonen- und Kimmerierlandes', *Petermann's Mitteilungen*, 72 (1926), 164 ff.; Idem, *Das vor- und frühgeschichtliche Altertum in seinen Kultur- und Handelsbeziehungen* (Leipzig, 1942), 126.

[4] J. B. Bury, 'The Homeric and the Historic Cimmerians', *KLIO*, VI (1906), 79 ff.

[5] W. Ridgeway, *Early Age of Greece*, I (2nd ed., Cambridge, 1931), 390.

[6] C. F. Lehman-Haupt, 'Kimmerier', *R.E. Pauly-Wissowa*, 21 (1921), 424. Earlier literature concerned with these topics has been summarised by E. H. Minns in *Scythians and Greeks* (Cambridge, 1913), 40 ff.

[7] *Loc. cit.* f.n. 6, 41.

must have lived there before invading Asia. Ancient legends of Argonauts,[8] Pontic place names mentioned by Artkinos and Eumelus, Greek poets of the eighth century B.C.,[9] the accounts of Heziod who lived in about 800 B.C.,[10] Homer's mention of the Scythian 'mare milkers' (*Iliad* XIII, 5), and also archaeological evidence, indicate that the Greeks were well acquainted with the lands around the Black Sea at an early date.[11] These circumstances imply that Herodotus must have been properly informed about the Pontic Cimmerians and about their identity with those of Asia Minor. On the other hand, theories placing Homeric Cimmerians in Western Europe contradict the geographical knowledge of the Greeks of that time.[12] Hecateus of Milet[13] in the sixth century B.C., and even Herodotus in the fifth century B.C., knew neither Western France nor Great Britain and Jutland.

Controversial views are also held in respect of the race of the Cimmerians. They are regarded as Thracians,[14] Iranians or at least a people with an Iranian ruling class,[15] as a Celtic tribe;[16] a few claim their eastern,[17] or Uralo-Altaic[18] origin. Consequently, the original seats of the Cimmerians have been variously located. They have been sought in the Ukraine west of the Dnieper, in the steppe east of that river, in the Kuban country and in the central Caucasian Highland.

Archaeological Identification

Different groups of archaeological remains have been connected with the Cimmerians,[19] but a closer examination of the many conceptions in this respect reveals that they all agree with just one, or two, stipulated conditions under which the identification of the given archaeological material with the Cimmerians can be regarded as satisfactory, and that none conforms to all requirements. Let us briefly review the most

[8] J. R. Bacon, *The Voyage of the Argonauts* (London, 1925), 168; A. R. Burn, *Minoans, Philistines and Greeks, B.C. 1400–900* (London, 1930), 189 ff.

[9] Bethe, 'Artkinos', *R.E. Pauly-Wissowa*, II (1898), 1172; W. Schmith and G. E. Marindin, *A Classical Dictionary* (1904), 102; H. T. Wade, in *Cambridge Ancient History*, III (1925), 534.

[10] T. W. Allen, *Homer, the Origins and the Transmission* (Oxford, 1924), 83.

[11] W. Ridgeway, *loc. cit.*, f.n. 5, 358; R. Henning, *Das vor-und frühgeschichtliche Altertum*, 153; A. M. Tallgren, 'La Pontide préscythique', *ESA*, II (1926), 220, etc.

[12] O. Thomson, *History of Ancient Geography* (Cambridge, 1948), 19 ff., 44 ff.; H. L. Lorimer, *Homer and the Monuments* (London, 1950), 78 ff.

[13] M. O. B. Caspari, *JHS*, XXX (1910), 236 ff.; F. Jacoby, 'Hecataios,' *R.E. Pauly-Wissowa* 7/2 (1912), 2667 ff.

[14] A. M. Tallgren, *loc. cit.*, f.n. 11, 217 ff.; E. H. Minns, in *Cambridge Ancient History*, III (1925), 195; S. P. Shestakov, 'Kimmeriitsi v arkheologii Ukrainy', *Zbirnyk A.I. Bahaliya* (Kiev, 1927), 309. Earlier authors were quoted in the work by V. F. Smolin, *O peredvizhenii gerodotovskikh Skifov v Perednei Azii* (Kazan, 1915), 6 ff., and then by A. I. Terenozhkin, 'K voprosu ob etničeskoi prinalezhnosti plemen Severnogo Pričernomorya v Skifskoe vremya', *Sov. Arkheologiya*, XXIV (1955), 8 ff.

[15] E. Meyer, *loc. cit.*, f.n.1; E. H. Minns, *loc. cit.*, 436.

[16] J. B. Bury, *loc. cit.*

[17] J. L. Myres, 'The Ethnology, Habitat, Linguistic, and Common Culture of Indo-Europeans up to the Time of the Migrations', *European Civilisation* (E. Eyre), II (1935), 206 ff.; V. A. Gorodtsov, 'K voprosu o Kimmeriiskoi kulture', *Trudy Sektsii Arkheologii RANION*, II (1928), 46 ff.

[18] Schrader, *Sprachvergleichung und Urgeschichte* (3rd ed., 1907), 487.

[19] See J. Harmatta, 'Le problème cimmérien', *Arch. Ertesitö*, VII–IX (1948), 90 ff.

important of these conditions, and then in their light discuss the main archaeological cultures taken into consideration by various authors.

The account of Herodotus suggests that the original home of the Cimmerians must have been somewhere in the eastern part of the Pontic steppe: the Scythians, in crossing the Araxes-Volga, entered the country inhabited by the Cimmerians; the retreating Cimmerians had crossed, or by-passed, the Caucasian Mountains which means that their previous seats must have been somewhere north of the Caucasus; all the topographic names connected with the Cimmerians, quoted by Herodotus, centre around the Sea of Azov, the only exception being the 'Cimmerian' barrow-graves on the Dniester in which the retreating Cimmerians are said to have buried their kings. The latter account does not imply that the original home of the Cimmerians must have been on the Dniester; it only suggests that the retreating Cimmerians, being split by the Scythians, one of their branches withdrew westwards.

The archaeological material considered as Cimmerian cannot have any connection with that which succeeded it within the same area. This condition conforms to the account of Herodotus (IV, 11), according to whom the Cimmerians, when their country was invaded by the Scythians, deliberated: the kings wished to fight for their country against the invaders, but the people thought that it was necessary to retreat. This dispute resulted in the Cimmerians fighting with one another instead of with the invaders. All their royal race perished in this fight, and their people buried them near the River Tyras-Dniester. They then abandoned the country and the Scythians, coming in, took possession of the deserted land.

The establishment of the date of the Cimmerian retreat is crucial for any attempt at their identification, and the archaeological material considered as Cimmerian must tally with that date.

The Scythian intrusion into the Pontic territory has been usually dated to the seventh century B.C.,[20] chiefly on the assumption that this event must have coincided with the emergence of the splendid 'Scythian' culture. Some authors shift this date back to the eighth century B.C.[21] However, none of these dates is supported either by the archaeological material concerned or by historic records.

The earliest relics of the 'Scythian' culture north of the Caucasus, as agreed by several

[20] M. Rostovtzeff, *Iranians and Greeks in South Russia* (Oxford, 1922), 41, 54; idem, *Skythien und der Bosporus*, I (Berlin, 1931), 270 ff.; V. G. Childe, 'Scythia', *Encyclopaedia Britannica*, 20 (1948), 238; A. I. Terenozhkin, 'Pamyatniki predskifskogo perioda na Ukraine', *Kr. S. IIMK*, XLVII (1952), 3 ff.; some authors date it to the turn of the eighth to seventh century B.C., e.g. A. M. Tallgren, *loc. cit.*, f.n. 11, 222 ff.; J. L. Myres, *loc. cit.*, f.n. 17; G. Borovka, *Scythian Art* (London, 1928); E. H. Minns, 'The Art of the Northern Nomads', *Proc. Br. Academy* XXVIII (1942), 15; A. A. Yessen, 'Nekotorie pamyatniki VIII–VII vv. do N.E. na Severnom Kavkaze', *Voprosy skifo-sarmatskoi arkheologii* (Moscow, 1954), 130 f.

[21] M. Ebert, *Sudrussland im Altertum* (Leipzig, 1921), 107; B. Grakov, *Skify* (Kiev, 1947), 18; A. A. Yessen, 'K voprosu o pamyatnikakh VIII-VII vv. do N.E. na Yuge evropeyskoi časti SSSR', *Sov. Arkheologiya*, XVIII (1953).

authorities,[22] date just from the first quarter of the sixth century B.C. No earlier antiquities of this kind were found in the territory in question. On the other hand, historic records point to a much earlier date for the advent of the Scythians. Aristeas of Proconessus, in his journey to east Pontic lands met only the Scythians there; at his time, not later than the seventh century B.C.,[23] the Cimmerians were already a forgotten people there. Heziod and Homer, both living presumably in the ninth century B.C.,[24] but in any case not later than in the eighth century B.C.,[25] knew only the Scythians (the 'mare milkers') in the Pontic territory. Their ambiguous references to the Cimmerians, and also a vague mention of them by Aristeas of Proconessus, evidently reflect ancient traditions of a country and of a people which were formerly known, but which were already forgotten. Only a fabulous notion of them remained in the memory of the peoples contemporary with the authors concerned.

The above facts imply that the exodus of the Cimmerians from their original country must have taken place at least a few centuries prior to the time in which lived the authors mentioned above. Accordingly, this event must have occurred not later than in the tenth century B.C., but presumably even at an earlier date; several eminent scholars put it in the last centuries of the second millennium B.C.[26]

Other remarks by ancient authors suggest that the Cimmerians were in the possession of a relatively large territory, and that they must have lived there for a long period. They seem to have been a large, well-organised people with a ruling class (the kings) at their head, which was overthrown shortly before the Scythian invasion.

The Catacomb Culture

In order to comply with the conditions stipulated in the preceding section, in search of the archaeological equivalent of the Cimmerians we have to go back to the second millennium B.C. The territory north of the Sea of Azov, east of the Dnieper, west of the Volga, presumably inhabited by the Cimmerians, was then in the possession of the Catacomb Culture; its name derives from a peculiar form of grave, a shaft with a niche dug in

[22] M. Ebert, *loc. cit.*, f.n. 22, 110 ff.; idem, 'Skytho-sarmatische Periode. Südrussland', *RL, Ebert*, XIII (1929); M. Rostovtzeff, *loc. cit.*, f.n. 21, 270 ff.; K. Schefold, 'Der skythische Tierstil in Südrussland', *ESA*, XII (1938); M. I. Artamonov, 'Voprosy istorii Skifov v sovetskoi nauke', *VDI* 3/21 (1947), 78; S. I. Kaposhina, 'Pamyatniki zverinogo stila iz Olvii', *Kr. S. IIMK* 34 (1950), 42 ff. See also my article: 'The Scythians in Western Asia', *Artibus Asiae*, XVII (1954), 316 ff.

[23] E. H. Minns, *CAH*, III, 188; M. I. Artamonov, 'K voprosu o proiskhozdenii Skifov', *VDI* 2 (1950), 37; earlier views in this respect were summarised by O. I. Pokrovskii, 'Herodot ta Aristey', *Zbirnyk A. I. Bahaliya* (Kiev, 1927), 323–340; A. Baschmakoff, 'Le problème scythique et l'énigma cimmèrienne', *Revue Anthropologique*, 42 (1932), 142 ff., dated this journey to the middle of the ninth century B.C.

[24] A. R. Burn, 'The World of Heziod', *History of Civilisation* (1936), 31; W. Ridgeway, *loc. cit.*, f.n. 5, 682; H. J. Rose, *Chambers's Encyclopaedia*, VII (1950), 76, 190; T. W. Allen, *loc. cit.*, f.n. 10, 76; W. F. Albright, 'Some Oriental Glosses on the Homeric Problem', *Am. Journ. of Arch.*, 54 (1950), 173, 176.

[25] H. L. Lorimer, *Homer and the Monuments* (London, 1950); J. B. Bury and R. Meiggs, *A History of Greece to the Death of Alexander the Great* (London, 1958), 211 ff.; T. Sinko, *Literatura grecka*, I/1 (Kraków, 1931), 28 ff.

[26] V. Parvan, *Getica* (Bucuresti, 1926), p. 727; idem, *Dacia, an Outline of the Early Civilisation of the Carpatho-Danubian Countries* (Oxford, 1928), p. 37; E. Wust, 'Kimmerier', *R.E. Pauly-Wissowa*, 34 (1937), 1970; A. Baschmakoff, *Cinquante siècles d'évolution ethnique autour de la Mer Noire* (Paris, 1937), 105 ff.; M. I. Artamonov, *K voprosu o proiskhozhdenii Skifov*, 44.

one of its sides.[27] M. I. Artamonov[28] and T. B. Popova[29] connected this culture with the Cimmerians, although their ideas were opposed by O. A. Krivtsova-Grakova.[30]

The chronology of the Catacomb Culture has been variously estimated, but the first half of the second millennium B.C. has been most frequently proposed.[31] A. M. Tallgren[31a] recommends the date 1700–1400 B.C., V. G. Childe[32] 1850–1550 B.C. (1450 B.C. in some parts of the country), and M. Gimbutas 1900–1700 B.C.[33] The latter date is evidently set too low and the time allocated to the development of the Catacomb Culture much too short.

I give more credit to the chronology put forward by T. B. Popova,[34] although it also needs revision. She distinguishes three stages in the development of the Catacomb Culture, the first of which covered the first quarter of the second millennium B.C., the second the second quarter, and the third the third quarter of that millennium. She also established several local groups of the culture which were not contemporary with each other; in particular the Middle Dnieper group was formed only after the disappearance of the group on the Donetz. A similar division into three stages has been proposed by A. A. Yerusalimskaya[35] for an additional group of the Catacomb Culture distinguished by her on the North Caucasian foothills; they dated, according to her, from 1700–1500 B.C., 1500–1200 B.C., and 1200–800 B.C. respectively.

First to disappear was the Don-Donetz group distinguished by T. B. Popova, which was abruptly replaced by the Srubna Culture. According to O. A. Krivstova-Grakova,[36] this event took place not earlier than in the thirteenth to twelfth century B.C., at a later date than estimated by T. B. Popova. The study of grave-goods of this group[37] reveals that it was still in existence in the fourteenth century B.C., consequently, its replacement by the Srubna Culture must have happened at a later date. O. A. Krivtsova-Grakova[38] also emphasises that no 'genetical connection' had existed between these two consecutive cultures. This, however, does not apply to other parts of the country where the Catacomb Culture survived longer, being only gradually replaced, or absorbed, by the Srubna

[27] For the description of this culture see: A. M. Tallgren, 'La Pontide', 28 ff.; V. G. Childe, *The Dawn of European Civilisation* (5th ed., 1950), 154 ff. (6th ed., 1957), 154 ff.; M. Gimbutas, *The Prehistory of Eastern Europe*, I (Cambridge, Mass., 1956), 80 ff.

[28] *K voprosu o proiskhozdenii Skifov*, 47.

[29] T. B. Popova, 'Plemena katakombnoi kultury', *Trudy GIM*, 24 (Moscow, 1955), 177.

[30] 'Stepnoe Povolzhe i Prichenomore v epokhu pozdnei bronzy', *Mat. i Issl.*, 46 (Moscow, 1955), 158.

[31] E.g.: N. Ya. Merpert and E. Yu. Kričevskii, in *Ocherki Istorii SSSR* (Moscow, 1956), 141 ff.; O. F. Lahodovska, in *Narysy starodavnoy istorii ukrainskoy RSR* (Kiev, 1957), 76; I. H. Shovkoplyas, *Arkheologichni doslidzhennya na Ukraini* (1917–1957) (Kiev, 1957), 133; etc.

[31a] 'La Pontide', 92; and also in: 'Bronzezeit. Südrussland', *RL, Ebert*, XIII (1929), 50.

[32] *The Dawn* (5th ed.), 331.

[33] *Loc. cit.*, f.n. 27, 91 ff.

[34] *Loc. cit.*, f.n. 29, 31 ff., 67 ff.; idem, 'Etapy razvitiya i lokalnye varianty katakombnoi kultury', *Sov. Arkheologiya*, XXII (1955), 21 ff.

[35] A. A. Yerusalimskaya, 'O peredkavkazkom variante katakombnoi kultury,' *Sov. Arkheologiya*, 2 (1958), 34 ff.

[36] *Loc. cit.*, f.n. 30, 89.

[37] T. B. Popova, *loc. cit.*, f.n. 29, 33 ff.

[38] 'Geneticheskaya svyaz yamnoi i katakombnoi kultury', *Trudy GIM*, 8 (Moscow, 1938).

Culture.[39] In the Crimea, marked influence of the Catacomb pottery is well reflected on vessels of the late Srubna Culture, of the turn of the II–I millennia B.C.[40] The same was probably the case with the Catacomb groups on the Dnieper.

The phenomenon of the sudden replacement of the Catacomb Culture in the Don-Donetz area by the Srubna Culture expanding from beyond the Volga fits well into the accounts of Herodotus concerning the advent of the Scythians, provided that an ancient tradition relating to earlier events and different peoples has not been transferred to the Cimmerians and in this form recorded by him. This cannot be ruled out but otherwise it seems that the Catacomb Culture complies also with other requirements required for its identification with the early Cimmerians. The final conclusion in this respect, however, depends on the establishment of some links between the Catacomb Culture and the historic Cimmerians of Asia Minor. In accepting approximately the thirteenth century B.C. proposed by O. A. Krivtsova-Grakova for the Srubna-Scythian invasion of the Pontic territory, we have still to dispose of the gap of five centuries which separates this event from the appearance of the Cimmerians on the Urartian border. The small group of the Catacomb Culture which, according to A. A. Yerusalimskaya, managed to survive up to the eighth century B.C. in the region of Armavir and Stavropol in the North Caucasus, does not seem to be a relief to these difficulties. This group might have been the equivalent of a small Cimmerian tribe; it was evidently not the equivalent of the large Cimmerian people which threatened the mighty Urartian kingdom. We have to look for another solution of this dilemma.

Kuban Barrow-Graves

Kuban barrow-graves[41] are another group of remains taken into consideration in the search for the archaeological equivalent of the early Cimmerians. M. I. Artamonov[42] points out that they obviously lie within the territory attributed to the Cimmerians by ancient Greek traditions.

Three consecutive periods have been distinguished in the development of the Kuban barrow-graves,[43] and three stages in the evolution of the North Caucasian metallurgy, corresponding with these, have been established by A. A. Yessen.[44] The earliest period, to which the barrow-graves of Maikop and Tsarskaya-Novosvobodnaya belong, dates either from the third or the very beginning of the second millennium B.C., although a much lower date has also been proposed.[45]

[39] A. V. Dobrovolskii and V. I. Kanivets, Bronzovyi vik. *Narysy starodavnoi istorii ukrainskoi RSR* (Kiev, 1947), 99.

[40] I. T. Kruglikova, 'Pamyatniki epokhi bronzy iz Kimmerika', *Kr. S. IIMK*, XLIII (1952), 108; O. A. Krivtsova-Grakova, *Stepnoe Povolzhe i Prichernomorie*, 106 ff.

[41] For their description see, e.g.: F. Hančar, *Urgeschichte Kaukasiens* (Wien-Leipzig, 1937), 243 ff., 255 ff.; A. M. Tallgren, in *RL, Ebert*, VII, 347 f.; M. Gimbutas, *loc. cit.*, f.n. 27, 56 ff., 66 ff.; V. G. Childe, *The Dawn* (5th ed.), 149 ff., (6th ed.), 154 ff.

[42] 'Tretyi razmennyi kurgan. u St. Kostromskoy', *Sov. Arkheologiya*, X (1948), 177.

[43] A. V. Schmidt, 'Die Kurgane der Stanica Konstantinovskaya', *ESA*, IV (1929), 9–21.

[44] 'K voprosu o drevneishei metalurgii medi na Kavkaze', *Vestnik GAIMK* (1935), 120.

[45] M. I. Artamanov, *loc. cit.*, f.n. 42, 161–182.

Graves of the Middle Kuban period (the second millennium B.C.) much resemble those of the steppe further north attributed to the Yamna and Catacomb Cultures respectively,[46] so that no well defined boundary-line can be drawn between them. The close connection between these two groups is well illustrated by two maps published by T. B. Popova,[47] of the distribution within the Catacomb territory of North Caucasian types of vessels and of bronze artifacts of Kuban origin. Convergences between these two groups suggest that they must have formed a larger cultural entity in which the Kuban Culture was evidently the dominant factor.

The Kuban-Catacomb complex had exercised a strong influence on the neighbouring cultures, and its influence on the Fatyanovo Culture has often been mentioned.[48] Kuban bronze objects were found far outside the Kuban-Catacomb area: a bronze axe formed part of the hoard from Stublo in Volhynia[49] of the Unetice period, and a 'cord-decorated' bronze ornament, evidently of Kuban origin, was excavated in a barrow-grave at Ostapie in North-West Podolia[50] together with a 'Zapfenbecher' characteristic of the late stage of the Central-European Corded Ware complex. It is interesting to note that a similar vessel was found in a slab-cist grave of the Digorian culture at Verkhnaya Koban in the Central Caucasian highland.[51]

According to many authors, the Middle Kuban culture which was contemporary with the Catacomb culture, was orientated westwards;[52] they consider its western elements as evidence of a Central European expansion responsible for the vital changes which initiated the Middle Kuban period. A western invasion has been denied by A. A. Yessen,[53] who nevertheless acknowledges the existence of western connections at that time. V. G. Childe[54] remarks that agreements between the Slavonian and Pecsel Cultures of Central Europe and the Kuban-Catacomb cultures in Eastern Europe are too close to be fortuitous, but their explanation is not yet practicable.

Central European connections relate mainly to the early Middle Kuban-Catacomb stage, to the beginning of the second millenium B.C.; later this contact was rather loose. By the middle of the second millennium B.C., trade connections with the Aegean countries expanded, well illustrated by the distribution of imported fayence beads found in a number

[46] M. I. Artamanov, 'Raboty na stroielstve manychkogo kanala', *Izvestya GAIMK* 109 (1934); and his subsequent reports in: *Sov. Arkheologiya*, IV (1937), XI (1949).

[47] *Loc. cit.*, f.n. 29, Fig. 21, p. 99, and Fig. 26, p. 111.

[48] O. N. Bader, 'K voprosu o balanovskoi kulture', *Sov. Etnografiya* (1950–1), 71 ff.; T. B. Popova, *loc. cit.*, f.n. 29, 122 ff.; see also: A. Häusler, 'Die kulturellen and wirtschaftlichen Beziehungen der Bevolkerungsgruppen Mittelrusslans am Ende der jüngeren Steinzeit', *Wissenschaftliche Zft. der M. Luther Universität Halle*, V (1956), 99.

[49] W. Antoniewicz, 'Der in Stubło in Wolhynien aufgefundene Bronzeschatz', *ESA* IV (1929), 135 ff.

[50] J. Bryk, 'Badania archeologiczne w Ostapiu na Podolu', *Swiatowit*, XVI (1936), 125, Pl. V: 12, 13.

[51] E. I. Krupnov, 'Pogrebeniya epokhi Cronzy v Severnoi Osetii', *Trudy GIM*, VIII (Moscow, 1938) 46, fol. 3.

[52] A. M. Tallgren, 'Etudes sur le Caucase du Nord', *ESA*, IV (1929), 38 ff.; idem, 'Zu der nordkaukasischen frühen Bronzezeit', *ESA*, VI (1931), 145; F. Hančar, *loc. cit.*, f.n. 41, 339 ff.

[53] 'K voprosu o drevnikh svyazyakh Severnogo Kavkaza z Zapadom', *Kr. S. IIMK*, XLVI (1952), 48 ff.

[54] *Prehistoric Migrations in Europe* (Oslo, 1950), 174 f.

of Catacomb graves,[55] and further east as far as Tobol in West Siberia.[56] Vessels decorated with rows of semi-circular stamps in a distinctively Usatove manner, found in the remains of the Manych group of the Catacomb Culture,[57] and also in the Caucasus,[58] point to relations with the Usatove culture on the Lower Dnieper.[59]

The chronology of the Middle Kuban period, and in particular its final date, has often been discussed. According to A. V. Schmidt,[60] it terminated at about 1600 B.C. A. M. Tallgren[61] subdivided this period into two stages and connected the first of these with the Unetiče period of Central Europe, the second one with the second period of the Bronze Age of Montelius. A. A. Yessen puts the initial date of the Middle Kuban period at about 1700 B.C. and lets it end in the twelfth to eleventh centuries B.C.[62] F. Hančar[63] dates his Kuban-Terek period to 1800–1200 B.C. It can be taken as granted that the Middle Kuban period was contemporary with the Catacomb Culture and concluded at about the same time in which this culture had ceased to exist.

A. A. Yessen[64] has devoted a special study to the late Kuban period in the North-West Caucasus, which lasted according to him from the twelfth to eleventh centuries to the seventh century B.C. The conclusion which can be drawn from this study is that meagre survivals of the splendid Middle Kuban Culture were under overwhelming influence from the Colchidic-Koban Culture dealt with in the following section. Their territory was restricted to a narrow strip on the Upper Kuban and its left tributaries, the region further north being in the possession of the Srubna Culture.

The Middle Kuban Culture seems to comply with the main requirements for its identification with the early Cimmerians. In this, however, it has to be treated as part of the larger Kuban-Catacomb complex and the same conditions must be applied to it which affect the other, especially the establishment of its links with the Western Asiatic Cimmerians of the eighth century B.C.

The Koban and Colchidic Cultures

A few scholars[65] consider the Koban culture[66] of the Caucasian Highland as the

[55] A. M. Tallgren, 'La Pontide', 108; T. B. Popova, *loc. cit.*, f.n. 29, 34.

[56] J. F. S. Stone and L. C. Thomas, 'The Use and Distribution of Faience in the Ancient East and Prehistoric Europe,' *Pr. P.S.*, XXII (1956), Fig. 3, p. 54.

[57] T. B. Popova, *loc. cit.*, f.n. 29, 130 ff., Figs. 1: 1, 2.

[58] E. I. Krupnov, 'Materialy po arkheologii Severnoi Osetii dokobanskogo perioda', *Mat. i. Issledovaniya*, 23 1951), 47, Fig. 11: 5.

[59] For its description see: M. Gimbutas, *loc. cit.*, f.n. 27, 108 ff.

[60] *Loc. cit.*, f.n. 43, 21.

[61] *Études sur le Caucase du Nord*, 35.

[62] 'K khronologii "bolshikh kubanskikh kurganov" ', *Sov. Arkhleologiya*, XII (1950), 199; idem, 'Prikubanskii ochag metallurgii i metalloobrabotki v kontse medno-bronzovogo veka', *Mat. i Issledov*, 23 (1951), 119.

[63] *Loc. cit.*, f.n. 41, 415.

[64] *Prikubanskii ochag metallurgii* (see f.n. 68).

[65] F. Hančar, 'Hallstatt-Kaukasus. Ein Beitrag zur Klärung des Kimmerier Problems', *MAG*, 73–77 (1947), 152 ff.; L. A. Elnitskii, 'Kimmeriitsy i kimmeriiskaya kultura', *VDI* (1949–3), 23; J. Harmatta, *loc. cit.*, f.n. 19, 90 ff.

[66] For its description see, e.g.: A. M. Tallgren, 'Koban,' *RL, Ebert*, VII, 11 f. C. F. Schaeffer, *Stratigraphie comparée et chronologie de l'Asie Occidentale, III–II millenaire* (London, 1948), 525 ff.; F. Hančar, Kaukasus-Luristan. *ESA*, IX (1934), 87 ff.

archaeological equivalent of the Cimmerians. The name of this culture derives from the Early Iron Age cemetery at Verkhnaya Koban in the Central Caucasus. This culture was formed in about the twelfth century B.C., as agreed by most authorities, although some prefer an earlier date, 1500–1400 B.C. Its final date has been usually estimated at about 1000–900 B.C.,[67] but recent investigations indicate that it had lasted longer. According to B. A. Kuftin,[68] the peak of the Colchidic Culture of Western Georgia, which was contemporary and closely connected with the Koban Culture, fell in the eighth century B.C. the period of the Urartian expansion in Transcaucasia, and his opinion is shared by A. A. Yessen.[69] According to E. I. Krupnov,[70] however, the Koban Culture developed during the period from the eleventh to the seventh centuries B.C., which is undoubtedly estimated too late. The development of the Colchidic Culture as shown by O. M. Dzhaparidze[71] covered the time from the thirteenth and twelfth to the eighth centuries B.C., and the same applies to the Koban Culture, although a number of Koban graves date from the seventh century B.C.

The Koban Culture, with its wealth in bronze ornaments and plenty of weapons, seems at first to fit well into the picture of the archaeological remains left by a warlike people which was able to menace the Western Asiatic empires. In addition, the date of its disappearance corresponds approximately with that of the Cimmerian penetration into Anatolia. Nevertheless, a closer scrutiny of all the circumstances reveals that it does not comply with all the conditions required for its identification with the early Cimmerians. Neither its geographical position nor its chronology agree with the respective accounts of Herodotus and other provisions quoted in the preceding sections.

The Koban Culture might, however, be connected with the second stage of the Cimmerian history which comprises the time from their abandonment of their original country up to their appearance in Western Asia in the eighth century B.C., provided that its derivation from, or at least a close connection with, the Kuban-Catacomb complex is established.

Many authors point to Central European relations of the Koban Culture, in particular with the Hallstatt Culture, and accordingly connect its origin with these. These views are strongly opposed by E. I. Krupnov,[72] according to whom the Koban Culture evolved out of its predecessor within the same area, the Digorian Culture, which was in part contemporary with the Kuban-Catacomb complex. Connections of both the Digorian and Koban Cultures with the Middle Kuban Culture were emphasised by E. I. Krupnov, and also by A. A. Yessen; the question, however, remains whether they can be regarded as sufficient to claim their parentage.

[67] For opinions in this respect see: C. F. Schaeffer, *loc. cit.*, f.n. 66, 529 f.; E. I. Krupnov, 'O proiskhozdenii i datirovke Kobanskoi kultury', *Sov. Arkheologiya*, 1 (1957), 79 f.

[68] *Urarstkii 'Kolumbarii' u podoshvy Ararata i Kuro-Araraksskii eneolit.* (Tbilisi, 1943), 67 ff.; idem, 'Prehistoric Culture Sequence in Transcaucasia', *South-Western Journal of Anthropology* 2 (1946), 240 ff.

[69] *Prikubanskii ochag metallurgii*, 119.

[70] *Loc. cit.*, f.n. 58, 79 ff.; idem, *K voprosu o khronologii Kobanskoi kultury* (Nalcik, 1946).

[71] 'Bronzovye topory Zapadnoi Gruzii', *Sov. Arkheologiya*, XVIII (1953), 300.

[72] 'O proiskhozdenii i datirovke', 79 ff.

On the other hand, many Koban bronzes, especially personal ornaments, but also a number of clay vessels of both Digorian and Koban Cultures, show close and unmistakable similarity to Central European types proper of the Bronze Age A/2 and B, but not to those characteristic of the Kuban-Catacomb complex. We shall later revert to this theme.

A culture very similar to the Koban Culture, and contemporary with it, had developed in Western Transcaucasia, in Georgia. It has been called the Colchidic Culture, and B. A. Kuftin[73] considers it as forming a branch of a wider Colchidic-Koban complex. Other authors[74] do not share this opinion and regard these as two closely connected but different cultures. According to B. A. Kuftin,[75] the Colchidic Culture developed locally out of its predecessor, the Georgian Bronze Age culture, the early representative of which was the Sachkhery cemetery. Grave-goods of the Georgian Bronze Age culture point to connections with the Digorian Culture of the highland, the Abkhasian dolmens[76] in Western Caucasus, and also with the Middle Kuban Culture; they likewise show agreements with the Unetice Culture of Central Europe.

However, nothing has been discerned, so far, among the relics of either the Koban or Colchidic cultures which would imply their close association, or derivation, from the Kuban-Catacomb complex. None of these cultures can, therefore, be definitely connected with the second stage of the Cimmerian history, although it seems quite possible that the Cimmerians have taken part in the formation of the Colchidic culture which extended over the territory which they must have crossed before reaching Asia. Perhaps different geographical surroundings in which the bearers of the Kuban-Catacomb complex have found themselves may have compelled them to change their ancient culture? Or, they were possibly too small a group of conquerors to leave notable traces in the newly-formed culture?

The other way of establishing the identity of the Colchidic culture with the Cimmerians, by linking it with the Cimmerian antiquities in Asia Minor, is also impracticable. No archaeological remains have been identified, so far, which could be definitely associated with the Cimmerians in the third stage of their history, the period of their deeds in Asia Minor, from the eighth century B.C. onwards. Exceptions to this are a few bronze arrow-heads, and probably also a clay 'incense-burner' on cross-foot with a partition in the bowl,[77] of a type very common in the Manych group of the Catacomb Culture and in the Middle Kuban group,[78] found in the Cimmerian layer at Alishar Hüyük, dating from about 680 B.C.[79]

[73] *O drevneishikh kornyakh gruzinskoi kultury* (Tbilisi, 1944), 313 ff.; see also: A. A. Yessen, *Prikubanskii ochag metallurgii*, 79 ff.

[74] O. M. Dzhaparidze, *loc. cit.*, 281 ff.; E. I. Krupnov, *loc. cit.*, f.n. 58, 59 ff.

[75] B. A. Kuftin, 'K voprosu o rannikh stadiyakh bronzovoi kultury na territorii Gruzii', *Kr. S. IIMK*, 8 (1940), 7 ff.

[76] M. M. Ivaščenko, 'Beiträge zur Vorgeschichte Abchasiens', *ESA*, VIII (1932), 98 ff. Idem, 'Issledovanie arkhaicheskikh pamyatnikov materialnoi kultury v Abkhazii', *Izvestiya Instituta Kavkazovedeniya*, 3 (1935); A. M. Tallgren, 'Dolmens of North Caucasia', *Antiquity*, VII (1933), 197 ff.; idem, 'Sur les monuments mégalithiques du Caucase Occidental', *ESA*, IX, 28 ff.

[77] T. Sulimirski, 'Scythian Antiquities in Western Asia', *Artibus Asiae*, XVII (1954), 302.

[78] A. M. Tallgren, 'Portable Altars', *ESA*, XI (1937), 66, Figs. 17–19; V. G. Childe, *Prehistoric Migrations*, 174, Fig. 136; T. B. Popova, 'K voprosu o kurilnitsakh "Severokavkazkogo tipa"', *Sov. Arkheologiya*, I (1957), 161 ff.

[79] E. F. Schmidt, *The Alishar Hüyük, Seasons of* 1928 *and* 1929, II (Chicago, 1933), 53, Fig. 496.

The Srubna Culture

Many Soviet scholars cling to the ideas of V. A. Gorodtsov,[80] modified to suit the results of new investigations, according to whom the Cimmerians were originally in the possession of the whole Pontic territory over which later the 'Scythian' culture extended. His 'Cimmerian Culture' consisted of a few groups of 'pre-Scythian' remains; one of these was late Bronze Age hoards and stray objects, representing exclusively 'eastern' types modelled mainly on objects characteristic of the Srubna (Timber grave) Culture in Eastern Russia. Other groups were a few Early Iron Age barrow-graves in the Ukraine west of the Dnieper, and all East Ukrainian early Iron Age earthworks of the Belsk type,[81] provided that they yielded no Greek pottery; otherwise they were considered as Scythian.

B. Grakov[82] emphasises that the Scythians have only gradually penetrated into the Cimmerian territory, consequently there was no break between the Cimmerian and Scythian cultures, the former being gradually transformed into the latter. It is not possible, therefore, to distinguish 'Cimmerian' remains from those of the 'early Scythians', especially as the 'Cimmerian culture' has not been sufficiently investigated, so far. According to O. A. Krivtsova-Grakova,[83] 'Cimmerian' were simply some local branches of the Srubna Culture, the bulk of which represented the Scythians. In a special work devoted chiefly to the Srubna Culture, she dismisses the ideas of A. I. Artamonov and others who place the ancient Cimmerians in the Kuban country and further north, and connect them with the Catacomb Culture.[84] However, her interpretations of historic records, and her chronology with regard to the Cimmerians, on which her conclusions are based, are evidently mistaken.

The name of the Srubna Culture,[85] deriving from a peculiar form of grave (a chamber built of timber logs), was applied by A. V. Gorodtsov to late Bronze Age barrow-graves in the East Ukrainian steppe country. Later, it has been extended to denote similar graves in other parts of the steppe and the Khvalinsk Culture[86] on the Lower Volga has also been included in this group. The geographical extent of this enlarged Srubna complex, at the time of its greatest extension after A. I. Briusov,[87] is shown in the map (Fig. 1).

[80] V. A. Gorodtsov, 'Bronzovyi vek na territorii SSSR', *Bolshaya Sov. Enciklopediya*, VII (1927), 622; idem, 'K voprosu o kimmeriiskoi kulture', *Trudy Sektsii Arkheologii RANIION*, II (1928), 46–60.

[81] A. Potapow, 'Die inkrustierte Keramik von Belsk', *ESA*, IV (1929), 162 ff.

[82] B. Grakov, *Skify* (Kiev, 1947), 18 ff.

[83] 'Chetvertaya nauchnaya Konferentsiya Instituta Arkheologii Akademii Nauk USSR', *Kr. S. IIMK*, XII (1946), 165.

[84] *Stepnoe Povolzhe i Prichenomorie v epokhu pozdnei bronzy* (1955), 158.

[85] For its description, see A. M. Tallgren, 'La Pontide', 28 ff.

[86] P. Rykov, 'Die Chvalynsker Kultur der Bronzezeit an der unteren Wolga', *ESA*, I (1927); P. Rau, 'Hockergräber der Wolgasteppe', *Mitteilungen d. Zentralmuseums Pokrowsk*, III (1928).

[87] *Ocherki po istorii plemen evropeiskoi chasti SSSR v neoliticheskuyu epokhu* (Moscow, 1952), 244, Fig. 67; idem, *Geschichte der neolithischen Stämme im europäischen Teil der USSR* (Berlin, 1957), 285, Fig. 67.

O. A. Krivtsova-Grakova agrees with A. M. Tallgren that the Poltavka Culture[88] on the Lower Volga represents the earliest, the pre-Srubna rudiment of the Srubna Culture, and distinguishes three stages in the development of the latter. The first period, to which the Seima-Borodino type of bronze spear-heads belong,[89] lasted from about 1500 to 1200 B.C. The Srubna Culture was then still restricted to the ancient Poltavka territory on the Lower Volga, but by the end of this period, in about the thirteenth century B.C., its western expansion began. At first, areas on the Don and the Donetz were affected, and the country on the Lower Dnieper had not been reached before the twelfth century B.C.

The second, the 'Khvalinsk period', is supposed to have continued to about 900 B.C. The Khvalinsk Culture, after which this period has been called, includes several elements of the Androvova Culture,[90] and in this it differs from the Srubna Culture of the territories further west which are free from this influence. O. A. Krivtsova-Grakova refutes the idea that the western drive of the Srubna Culture, and the constitution of the Khvalinsk Culture in the original area of the former, were the consequence of eastern pressure. On the other hand, the account by Herodotus (IV, 11) of the Scythians entering the Cimmerian territory after being harassed by their eastern neighbours, the Massagetae, favours such an interpretation of the formation of the Khvalinsk Culture.

During the Khvalinsk period, the genuine Srubna Culture had penetrated into the territory on the Lower Don and the Manych. Further west, on the Lower Dnieper, it is said to have initiated the 'Belozerka period', called after a settlement on the Belozerka Liman on the Dnieper;[91] this settlement, according to O. A. Krivtsova-Grakova, was in existence from the eleventh to the beginning of the ninth century B.C. Ukrainian scholars[92] are against the attribution of these remains to the Srubna Culture. Sherds of a large vessel of Catacomb type found in this earthwork indicate that it had some links with the Catacomb Culture.[93]

In the third, final, period from 900 to 700–600 B.C., the Sauromatian culture had replaced the Khvalinsk culture on the Lower Volga, but further west the Srubna Culture had developed up to the 'Scythian' period and penetrated into the Crimea. Pottery of two late Srubna settlements in East Crimea, Kimmerikos and Tselki,[94] includes many elements characteristic of the Catacomb pottery; the first of these was contemporaneous

[88] O. A. Krivtsova-Grakova, *Stepnoe Povolzhe i Prichenomore*, 15 ff.; A. M. Tallgren, *La Pontide*, 223; P. Rau, 'Neue Funde aus Hockergräbern des Wolgadeutschen Gebiets', *ESA*, IV (1929), 41 ff.

[89] A. M. Tallgren, *La Pontide*, 134; O. A. Krivtsova-Grakova, 'Besarabskii klad', *Izdania GIM* (Moscow, 1949); M. Gimbutas, 'Borodino, Seima and their Contemporaries', *Pr. Pr. S.*, XXII (1956), 143 ff.

[90] O. Krivtsova-Grakova, 'Une trouvaille d'objets de l'age du bronze dans la région du haut Tobol', *ESA*, IV (1929), 116 ff.; idem, *Stepnoe Povolzhe i Prichenomorie*, 38, 42 ff.; S. P. Tolstov, 'The Prehistoric Cultures and Primitive Irrigation Systems of Ancient Chorasmia', *13th Annual Report, Univ. of London Institute of Archaeology* (1958), 18 ff.

[91] O. A. Krivtsova-Grakova, 'Poselenie bronzovogo veka na Belozerskom limane', *Kr. S. IIMK*, XXVI (1949), 76 ff.; idem, *Stepnoe Povolzhe i Prichenomore*, 117 ff.

[92] A. V. Dobrovolskii and V. I. Kanivets, *Narysy starodavnoi istorii Ukrainskoi RSR*, 101; I. H. Shosvkoplya, *Arkheolohichni Doslidzhennya*, 141.

[93] *Arkheolohichni Pamyatky URSR*, IV (1952), 195.

[94] I. T. Kruglikova, 'Pamyatniki epokhi bronzy iz Kimmerika', *Kr. S. IIMK*, XLIII (1952); O. A. Krivtsova-Grakova, *loc. cit.*, 106 ff.

with the Belozerka settlement, the other was of a later period. This implies that in the Crimea, the Catacomb Culture had survived up to the late Srubna period.

O. A. Krivtsova-Grakova considers the above Eastern Crimean settlements as Cimmerian, but similar settlements on the Lower Dnieper and on the northern shore of the Sea of Azov she regards as Scythian; the main difference between these two groups of settlements consists in that the latter (the 'non-Cimmerian' group) shows no Catacomb reminiscences. In spite of that this author does not take the Catacomb Culture into account in her search for the archaeological equivalent of the Cimmerians. In her final conclusions she alleges that the Scythians and Cimmerians lived side by side, and that the Srubna Culture was common to both: some of its local groups were Cimmerians, the bulk were Scythians. The question, however, as to the original Cimmerian Culture of the period prior to their living side by side with the Scythians, has not been even mentioned by her. Evidently, this was not the Srubna Culture, a culture formed outside the original Cimmerian territory as defined by historic tradition.

Historic records and actual archaeological material are against the Srubna Culture being regarded as left by the Cimmerians. This was evidently the archaeological equivalent of the Scythians of the period preceding the formation of the 'Scythian' culture. The latter was formed in the sixth century B.C.[95]

A recent article by E. I. Krupnov[96] should also be mentioned here. This author accepts the ideas of V. A. Gorodtsov and his followers concerning the 'Cimmerian Culture' in the Ukrainian steppe country consisting of early Srubna bronzes; he tries to show that the bearers of this culture, supposedly the Cimmerians, had penetrated into the central part of the Caucasus on their way to Western Asia. A closer scrutiny of the 'Cimmerian' bronzes listed by E. I. Krupnov reveals that they consisted of two different sets. One of these was Srubna bronze types similar to those included by V. A. Gorodtsov to his 'Cimmerian Culture'; they were found only along the northern edge of the Caucasian foothills and mark simply the southern boundary of the spread of the Srubna Culture. The other group is composed of bits, cheek-pieces, etc., already dealt with by A. A. Yessen, and of bronze vessels and sickles, which all form part of the Koban Culture. We shall discuss later similar remains found in the Ukraine, where they were included in the Chornii-Lis Culture, and also in Central Europe, where they belong to the so-called 'Thraco-Cimmerian' remains.

West Pontic Cultures

Several scholars sought the Cimmerians in the Ukraine west of the Dnieper. A. M. Tallgren,[97] who regarded them as a Thracian tribe living somewhere near the Carpathians, claims that they later expanded eastwards up to the Caucasus. He attributed to them 'Hungarian' bronze hoards and stray objects found in the Ukraine. These bronzes

[95] T. Sulimirski, *Scythian Antiquities in Western Asia*, 316 ff.
[96] 'Kimmeriitsy na Severnom Kavkaze', *Mat. i. Issled*, 68 (1958), 176 ff.
[97] 'La Pontide', 217 ff.

were undoubtedly closely connected with the graves and settlements described quite incorrectly, as of the 'Komarów Culture'.[98] The genuine Komarów Culture[99] consisted of barrow-graves of the Middle Bronze Age (Reinecke B-D) extending over the Carpathian foothills in south-eastern pre-war Poland, which were closely related to the Bohemian and Slovak tumuli. The Komarów Culture evolved out of the local Corded Ware group under trans-Carpathian influence, and this current had also reached further east, into the forest-steppe zone of the Ukraine.[100] However, neither the 'Komarów' type of graves nor the 'Hungarian' bronzes crossed the Dnieper, the only exception being two finds reported from beyond that river,[101] both typical of the second period of the Bronze Age according to Montelius.

But further north traces of a similar, but nevertheless different, diffusion can be followed considerably further east. These were cemeteries and single graves, likewise included to the Komarów Culture by Ukrainian scholars,[102] which were evidently connected with the Central Polish Trzciniec Culture,[103] and to a lesser degree with the Komarów Culture. They extended along the border of the forest and forest-steppe zones in Volhynia,[104] then along the Seim east of the Dnieper up to Putyvl.[105] Further east vessels strikingly similar both in shape and decoration to those of the Komarów-Trzciniec type were found in a few early Srubna graves along the Ukraino-Russian border;[106] pottery and/or bronze ornaments resembling those of the Komarów group were excavated in early Khvalinsk graves on the Volga[107] and even in West Siberia[108] and the

[98] A. V. Dobrovolskii and V. I. Kanivets, *loc. cit.*, f.n. 92, 89 ff.; I. H. Shovkoplyas, *loc. cit.*, f.n. 31, 137 ff.

[99] T. Sulimirski, 'Das Hügelgräberfeld in Komarów und die Kultur von Komarów', *Bulletin International de l'Academie Polonaise* (Cracow, 1936); J. Kostrzewski, *Prehistoria Ziem Polskich* (Kraków, 1939–1949), 214 ff.

[100] A. Bobrinskoy, *Kurgany i sluchainyya arkheologicheskiya nakhodki bliz miestechka Smyely*, II (St. Petersburg, 1894), Pl. IX, 7, 8; III (1901), Pl. II, 4; A. M. Tallgren, 'La Pontide', 147 ff.; A. I. Terenozhkin, 'Srednee Podneprovie v nachale zheleznogo veka', *Sov. Arkheologiya*, 1957–2, 57 f.; *Arkheolohichni Pamyatky*, IV (1952), 193; I. H. Shovkoplyas, 'Kurhannyi mohylnyk peredskifskoho chasu na serednomu Dnistri', *Arkheolohichni Pamyatky URSR*, IV (1952), 5 ff., idem, 'Serednodniprovska expeditsiya 1949–1951 rr,' *Arkheolohichni Pamyatky URSR*, VI (1956), 34 ff.; I. H. Shovkoplyas and E. V. Maxymov, 'Doslidzhennya kurhannoho mohylnyka peredskifskoho chasu na serednomu Dnistri', *Arkheologiya*, VII (1952), 89 ff.; O. F. Lahodovska, 'Poselennya chasu piznoi bronzy v s. Sandraky', *Arkheologiya*, IX (1954), 140; S. S. Berezenskaya and H. T. Titenko, 'Novi rozkopky pamyatok bilohrudivskoho typu', *Arkheologiya*, IX (1954), 128.

[101] Novopavlovka, Orlovo. A. M. Tallgren, *La Pontide*, 146, Fig. 81; idem, *ESA*, XI (1937), 8, Fig. 12.

[102] See f.n. 98.

[103] J. Kostrzewski, *loc. cit.*, f.n. 99, 212 ff.; S. Nosek, 'Zagadnienie prasłowiańszczyzny w świetle prehistorii', *Swiatowit*, XIX (1948), 57 ff.; A. Gardawski, 'Plemiona kultury trzcinieckiej w Polsce' ('Tribes of the Trzciniec Culture in Poland'), *Materiaty Starożytne*, V (1959), 7 ff., map. Pl. II.

[104] I. Levyckyj, 'Statsiya v ur. Pishchanomu bilya Narodych', *Antropologiya*, IV (1931), 226 ff.; O. Lahodovska, 'Voytsekhivskyi mohylnyk bronzovoi doby na Volyni', *Arkheologiya*, II (1948), 62 ff.; O. F. Lahodovska and Yu. M. Zakharuk, 'Novi doslidzhennya voytsekhivskoho mohylnyka', *Arkheologichni Pamyatky URSR*, VI (1956), 69 ff.

[105] V. A. Illinska, 'Novi dani pro pamyatky doby bronzy v livoberezhnomu lisostepu', *Arkheologiya*, X (1957), 50 ff.; S. S. Berezanska, 'Pamyatky periodu serednoi bronzy na Desni ta Seimi', *Arkheologiya* XI, (1957), 87 ff., Fig. 2 (map).

[106] A. M. Tallgren, 'La Pontide', 70, Fig. 47; R. I. Bershtein, 'Rozkopky dvokh kurhaniv bilya Voroshylovhrada', *Arkheolohichni Pamyatky*, VI (1956), 90 f., Fig. II: 3; V. V. Holmsten (ed.), *Arkheologicheskie Issledovaniya v RSESR*, 1934–1936 gg. (Moscow–Leningrad, 1941), 169, Pl. XXVI, 11.

[107] P. Rau, *Hockergräber der Wolgasteppe*, Pl. V. 8.

[108] O. Krivtsova-Grakova, *ESA*, IV (1929), 116 ff., Fig. 10, 11; idem, 'Alexeevskoe poselenie i mogilnik', *Trudy GIM* (Moscow, 1948), Figs. 35, 37.

Caucasus.[109] The similarity of the early Koban bronze ornaments to those from Central Europe has been often discussed.[110] A reciprocal relationship is attested by a small early Srubna bronze dagger[111] found together with a bronze pin of the Borodino type[112] and typical 'Komarów' pottery in barrow-grave 6 at Komarów.[113]

Of particular interest is the circumstance that no such remains were found within the Kuban-Catacomb territory, although the Catacomb Culture was then still in existence. All these relics were of a later date than the Aegean imports of the fourteenth century B.C. mentioned in one of the preceding sections. They dated from the thirteenth century B.C., periods B.C. of Reinecke's Bronze Age, but no objects characteristic of later periods of the Central European Bronze Age have reached the Volga and the Caucasus. This implies that the contact with Central Europe must have been severed shortly before 1200 B.C., which was evidently consequent on the western advance of the Srubna Culture.

It seems very unlikely that the spread of the Komarów-Trzciniec type of remains was connected with a migration of the Cimmerians.

In recent Ukrainian archaeological literature, the Cimmerians are frequently associated with late Bronze Age antiquities of the Ukraine west of the Dnieper. A. V. Dobrovolskii and A. V. Kanivets, following A. V. Gorodtsov, call the Ukrainian Late Bronze Age simply the 'Cimmerian period', embracing the eleventh to eighth centuries B.C.[114] Their 'Cimmerian Culture' includes, besides bronze hoards and stray objects, a number of earthworks and settlements investigated after the last war in the steppe country on the Dnieper. Of the same opinion is I. H. Shovkoplyas.[115] Unlike O. A. Krivtsova-Grakova, they do not ascribe these settlements to the Srubna Culture.

Different views were expressed by O. I. Terenozhkin[116] according to whom the Cimmerians who lived on the Lower Dnieper were the descendants of the bearers of the Srubna Culture. He distinguishes a 'late Cimmerian period', lasting from the ninth to the beginning of the seventh century B.C. By the end of the eighth century B.C. all 'Cimmerian' earthworks and settlements were destroyed and abandoned in consequence of an invasion from beyond the Dnieper. New settlements, which replaced them, differed considerably from the old ones; but in spite of that this author likewise considers them as Cimmerian. Up to the middle of the seventh century B.C., they were gradually taken over by the Scythians, and then the 'early Scythian period' began. The archaeological material from the new settlements was late Srubna, but O. I. Terenozhkin, like

[109] E. I. Krupnov, *Materialy po arkheologii Severnoi Osetii*, 47, Fig. 3, 4.

[110] Wilke, 'Archäologische Parallelen aus dem Kaukasus und den unteren Donauländern', *Zft. f. Ethnologie*, 399, 63 (104–104).

[111] Of the type, e.g., A. M. Tallgren, 'La Pontide', 77, Fig. 51, 7; O. A. Krivtsova-Grakova, *Stepnoe Povolzhe i Prichernomore*, 55, Fig. 12, 6, 7, 9.

[112] See: I. Nestor, 'Depôt (?) de bronze de Medgidia (Dobrugea)', *Dacia*, V/VI, 1938, 187; *Narysy Starodavnoi Istorii Ukrainskoi RSR* (1957), 91, Fig. 1.

[113] My own excavations of 1934, unpublished.

[114] *Loc. cit.*, f.n. 39, 100.

[115] *Arkheolohichni doslidzhennya*, 141.

[116] *Narysy Starodavnoi istorii ukrainskoi RSR*, 111 ff.

B. Grakov, remarks that early Scythian remains did not much differ from those of the Cimmerians and cannot, therefore, be distinguished from them.

Theories placing the early Cimmerians in the steppe country on the Lower Dnieper, or further north, conform to almost none of the stipulated conditions of such an identification. I may add that the ideas of O. I. Terenozhkin, and others, relating to the Cimmerian inroads into Asia Minor, which are supposed to have proceeded from the area on the Lower Dnieper, are in contradiction with all historic evidence in this respect and do not take into account either the distances or the topography of the countries involved.

The Lower Dnieper remains, and perhaps also those on the Middle Dnieper, may, however, be connected with the second stage of the Cimmerian history, after their retreat from their original country on the Donetz. This likewise relates to the Crimean remains where the Catacomb Culture has influenced the late Srubna pottery; it should be mentioned that some authors regard the Crimea as the original country of the Cimmerians.[117] Further north, as agreed by both T. B. Popova and O. A. Krivtsova-Grakova, the Catacomb Culture had persisted at least to the thirteenth or twelfth centuries B.C., but nothing has been found in the remains of succeeding cultures there which could be regarded as its inheritance.

The Thraco-Cimmerian Remains

The review of the main groups of archaeological remains attributed to the Cimmerians would not be complete if an important set of these were omitted. These are a series of bronze horse trappings, bits, cheek-pieces, etc., of Caucasian, Koban, origin found in the area on the Dnieper; to this group also belong a large number of locally made bronze artifacts modelled on Transcaucasian prototypes. These objects imply that close ties must have then connected the Dnieper country with Transcaucasia, and one might even suppose that these ties were based on kinship of the bearers of the respective cultures.

According to A. A. Yessen,[118] these antiquities date from the eighth and the beginning of the seventh century B.C. G. Kossak[119] rightly opposed such a low chronology, which is based on the low date of the Koban culture proposed by E. I. Krupnov.[120] The peak-period of that culture was the ninth to eighth century B.C.,[121] the Ukrainian remains in question therefore must have dated from that period; this is likewise supported by other Transcaucasian imports in the same area, e.g. by the bronze hoards from Tcherniakhiv and Podgortsa, both dating from about 800 B.C.[122]

[117] M. Rostovtsev, *Iranians and Greeks*, 9; A. R. Burn, *Minoans, Philistines and Greeks*, 191.

[118] *Nekotorye pamyatniki VIII–VII vv. do n.e. na Severnom Kavkaze*, 127, ff.; idem, 'K voprosu o pamyatnikach VIII–VII vv. do n. ery v yuge evropeiskoi chasti SSSR', *Sov. Arkheologiya*, XVIII (1953), 49–110.

[119] G. Kossak, 'Pferdegeschirr aus Gräbern der älteren Hallstattzeit Bayerns', *Jahrbuch d. röm.-germ. Zentralmuseums Mainz* (1953), 146 ff.

[120] See f.n. 71.

[121] See f.n. 69, 73, and also: E. H. Minns, 'Trialeti', *Antiquity*, XVII (1943), 134.

[122] A. M. Tallgren, 'La Pontide', 158 ff, Figs. 93; 122, 3.

O. I. Terenozhkin[123] and I. H. Shovkoplyas[124] assign the above antiquities to the Chornii-Lis Culture, called after an earthwork on the Inguletz. The first of these authors[125] is of the opinion that the bearers of this culture, which developed during the period 800–650 B.C., were the Thracians, but P. Reinecke considered them as 'Thraco-Cimmerian' and connected them with analogous antiquities in Central Europe.

A considerable number of bits, cheek-pieces, and also swords or daggers, etc., closely resembling those from the Ukraine and in part also their Caucasian prototypes, were found in Central Europe, in particular in the Hungarian Plain. They were dealt with by several authors[126] who call them, after P. Reinecke, the 'Thraco-Cimmerian remains'. They appeared there by the end of Hallstatt B period (end of the eighth century B.C.), but were chiefly of Hallstatt C period.[127] S. Gallus and T. Horváth[128] pointed out that they mark an invasion of 'un peuple cavalier préscythique' which resulted in an abrupt end of the Hungarian Bronze Age. It is of interest to note that these remains stop at the line, drawn by V. G. Childe,[129] of the eastern reach of the Hallstatt swords. It seems that this 'Iron Curtain' of the past had prevented them from moving further west.

In this context it should be remembered that, according to O. I. Terenozhkin,[130] settlements on the Lower Dnieper dealt with in the preceding section, which this author considers as Cimmerian, were destroyed and replaced by Srubna settlements in the eighth century B.C. Approximately the same were the dates of the downfall of the Colchidic-Koban Culture and of the Cimmerian assault on the Urartian kingdom. These agreements do not seem to be fortuitous; they suggest that the eighth century B.C. was a period of great disturbances in the southern parts of Eastern Europe which brought to the end a nearly 400-year-long era of relative peace. The appearance at that very time of 'Thraco-Cimmerian' elements in Central Europe was obviously connected with these events.

We may presume, therefore, that a new drive of the Srubna-Scythian tribes in the eighth century B.C. provoked the displacement of several peoples in the Ukrainian steppe country, some of which retreated westwards and eventually crossed the Carpathians. The question remains, however, whether the 'Thraco-Cimmerian' antiquities of Central Europe can be considered as Cimmerian? They might be considered as such only on the assumption that similar Ukrainian remains were Cimmerian, but the only title of the latter in this respect rests on their connection with the Colchidic-Koban complex.

[123] 'Pamyatniki predskifskogo perioda na Ukraine', *Kr. S. IIMK*, XLVII (1952), 3 ff.; idem, 'Kultura predskifskogo vremeni v Srednem Podneprovie. Voprosy Skifo-Sarmatskoi prinadlezhnosti lesostepnykh plemen severnogo Prichenomoria v Skifskoe vremya', *Sov. Arkheologiya*, XXIV (1955), 7 ff.

[124] *Arkheolohichni doslidzhennya*, 150 ff.

[125] O. I. Terenozhkin, 'Predskifskii period v dneprovskom lesostepnom Pravobrezhie', *K.S. IIMK* (Moscow, 1958), 17 ff., 27 ff.

[126] The literature concerned has been quoted by J. Harmatta, *Arch. Ertesito* (1948). See also: T. Sulimirski, 'Problems of the Bronze Age and the Beginning of the Early Iron Age in Eastern Europe', *University of London Institute of Archaeology, Occasional Paper No.* 6 (1944), 44 ff.; Z. Vinski, 'Tratsko-kimmeriiskii nalaz Adashevtsi u Sriyemu', *Rad Voyvodianskikh Muzeya*, 4 (1955), 27.

[127] G. Kossak, *loc. cit.*, f.n. 119, 111 ff.

[128] S. Gallus and T. Horváth, 'Un peuple cavalier préscythique en Hongrié', *Dissertationes Pannonicae*, 2 (1939).

[129] 'The Final Bronze Age in the Near East and in Temperate Europe', *Proc. Pr. Soc.*, XIV (1948), 191, Fig. 9.

[130] See f.n. 123.

No associations of the Chornii-Lis remains with the Catacomb Culture have been disclosed, so far, and the sole link between the Belozerka settlement in the steppe country on the Lower Dnieper and the Catacomb Culture was a potsherd typical of the latter found in this settlement, as mentioned already.[131] Nevertheless, if the Central European finds are Cimmerian, at least in part, then they are the last vestiges of this people which definitely vanished in about 500 B.C., when the Scythians invaded the Hungarian Plain. In Anatolia, the Cimmerians had already disappeared in the seventh century B.C.

Summary

The above review of the more important attempts to solve the Cimmerian enigma reveals that historic records and traditions concerning this people are too vague and too fragmentary to form a proper basis for their undisputed archaeological identification. In the existing conditions, however, the following conclusions seem to be most credible:

(1) Three periods should be distinguished in Cimmerian history which covered a time-span of over 1,000 years. This division is consequent on great disturbances caused by the drive of eastern peoples in the thirteenth century and then again in the eighth century B.C., which each time affected the whole steppe belt of Eastern Europe. The first period lasted from the formation of the Cimmerian people, probably at about 1800–1700 B.C., to the thirteenth century B.C. The intermediate period, that of the thirteenth to eighth centuries B.C., constituted the second phase of their history and the third after their second disaster in the eighth century B.C., ended with their disappearance about 500 B.C.

(2) During the three stages of their history, the Cimmerians dwelt in different countries. Their original homeland was the steppe country north of the Caucasus up to the Donetz. This country being invaded by the Scythians, they retreated southwards and westwards. During the second period, their branches probably lived in the Caucasus, the Crimea and in the country on the Dnieper; those who remained in their homeland were overrun by the Scythians and gradually absorbed by them. After being ousted again from their new settlements, the Caucasian branch of the Cimmerians invaded Asia Minor, where the third stage of their history was recorded by the Assyrians and the Greeks. It seems very probable that, under similar conditions, the Ukrainian branch of the Cimmerians, or part of it, retreated to Central Europe, there to complete the third stage of their history.

(3) Different cultures are the archaeological equivalent of the Cimmerians in various countries in which they subsequently dwelt. The Catacomb-Kuban complex represents, most probably, the relics of the earliest stage of their history during which they lived in their original country. The Colchidic and Koban cultures in the Caucasus, the later Catacomb remains in the Crimea and on the Dnieper, and also the settlements of the Belozerka type there, may perhaps be connected with the second stage of the Cimmerian history, but this is more problematic in respect of the Ukrainian antiquities of Caucasian

[131] See f.n. 93.

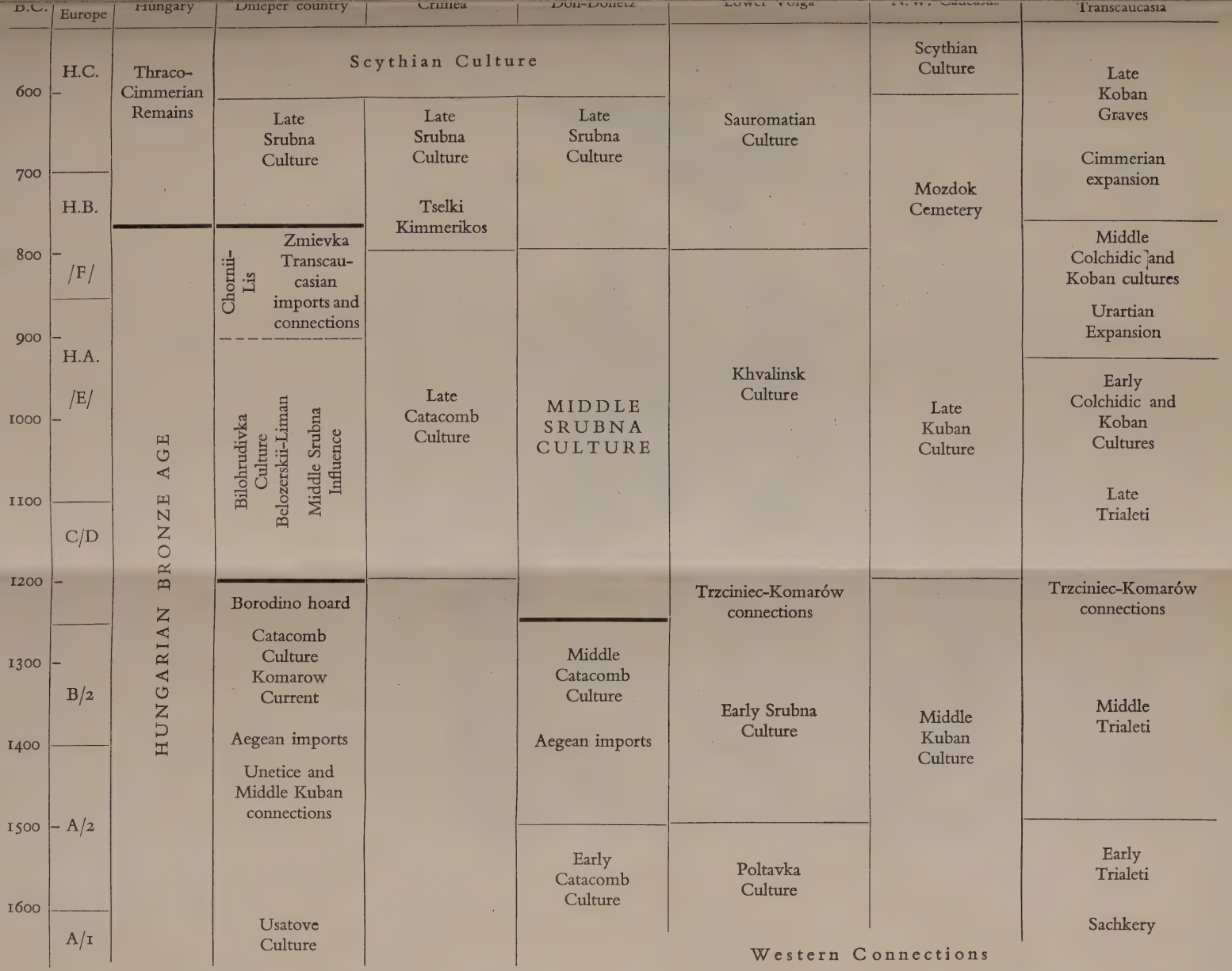

B.C.
Europe
Hungary
Dnieper country
Crimea
Don-Donetz
Lower Volga
N.W. Caucasus
Transcaucasia
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
H.C.
H.B.
/F/
H.A.
/E/
C/D
B/2
A/2
A/1
Thraco-Cimmerian Remains
HUNGARIAN BRONZE AGE
Scythian Culture
Late Srubna Culture
Late Srubna Culture
Late Srubna Culture
Tselki Kimmerikos
Sauromatian Culture
Scythian Culture
Late Koban Graves
Cimmerian expansion
Mozdok Cemetery
Middle Colchidic and Koban cultures
Urartian Expansion
Zmievka Transcaucasian imports and connections
Chornii-Lis
Bilohrudivka Culture
Belozerskii-Liman Middle Srubna Influence
Late Catacomb Culture
MIDDLE SRUBNA CULTURE
Khvalinsk Culture
Late Kuban Culture
Early Colchidic and Koban Cultures
Late Trialeti
Borodino hoard
Catacomb Culture Komarow Current
Aegean imports
Unetice and Middle Kuban connections
Usatove Culture
Middle Catacomb Culture
Aegean imports
Early Catacomb Culture
Trzciniec-Komarów connections
Early Srubna Culture
Poltavka Culture
Middle Kuban Culture
Trzciniec-Komarów connections
Middle Trialeti
Early Trialeti
Sachkery
Western Connections

Fig. 1.

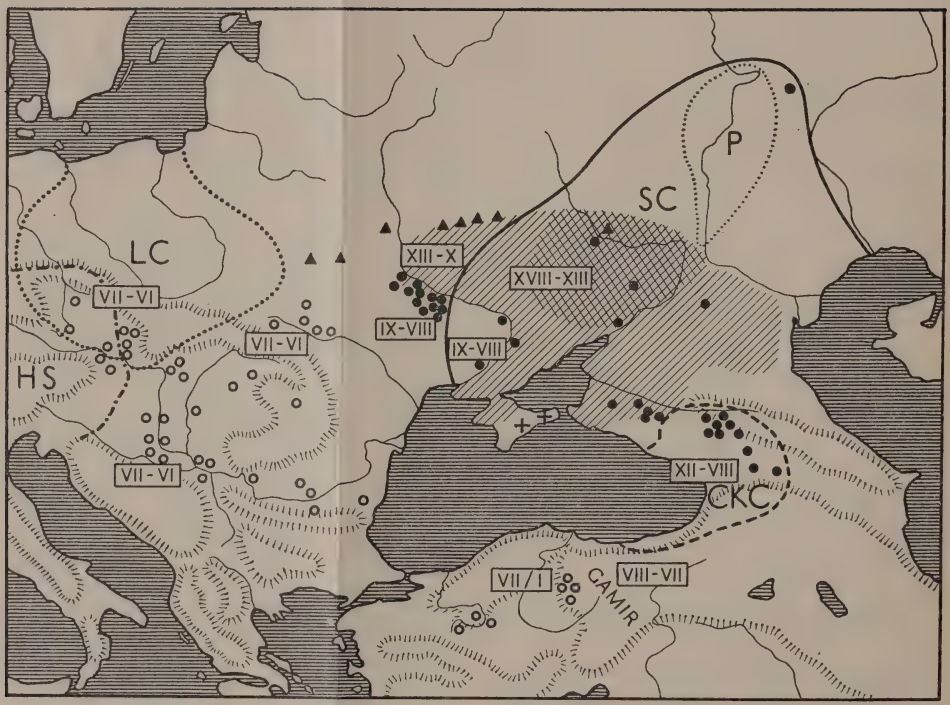


Fig. 2. Map illustrating the supposed movements of the Cimmerians.

The extent of the Catacomb Culture (after T. B. Popova), marking probably the original settlements of the Cimmerians in the first stage of their history (1700–1250 B.C.).

The extent of the Don-Donetz group of the Catacomb Culture, first invaded by the Srubna Culture.

•

The distribution of the Caucasian bits and cheek-pieces (after A. A. Yessen), marking the areas supposedly inhabited by the Cimmerians in the second stage of their history (thirteenth to eighth century B.C.).

+

Crimean late Srubna settlements with Catacomb-influenced pottery.

o

In Asia: Bronze arrowheads found in 'Cimmerian' layers, being traces of the Cimmerians in the third, final stage of their history.
In Central Europe: 'Thraco-Cimmerian' remains marking perhaps the third stage of the history of the western branch of the Cimmerians.

▲

Remains of Trzciniec-Komarów type in the Ukraine.

LC

Territory of the Lusatian culture.

HS

The area of distribution of iron Hallstatt swords (after V. G. Childe).

SC

The greatest extent of the Srubna Culture, marked by a heavy line (after A. I. Briusov).

P

The extent of the Poltavka Culture (dotted line).

CKC

The extent of the Koban and Colchidic Cultures (after B. A. Kuftiu).

In squares are indicated the centuries in which the Cimmerians have supposedly lived in the given areas.

type. No archaeological equivalent of the third stage of Cimmerian history has been ascertained, so far, in Anatolia, but the so-called 'Thraco-Cimmerian' remains in Central Europe might possibly have had some connection with this final period of their history.

The map shows the assumed Cimmerian settlements in the consecutive stages of their history and indicates the dates of their movements. The table shows the chronological correlation of the various cultures mentioned in this study.

I am much indebted to The Seven Pillars of Wisdom Trust (Professor A. W. Lawrence) for the assistance which enabled me to complete this study.

An Urartian Archer on the Zinjirli Chariot Relief.

By K. R. Maxwell-Hyslop

The two basalt reliefs illustrated on Pl. III were published by von Luschan in *Ausgrabungen in Sendschirli*, III, Pl. XXXIX, and portray a familiar type of chariot scene known from other sites in South-East Anatolia and North Syria. The vanquished enemy shown beneath the horse, the driver, and the archer aiming his bow with a long spear sticking out of the back of the chariot, with quivers of arrows on its side, are features not unique to Zinjirli and are portrayed at Carchemish. The shield with central lion's head, shown on the back of the chariot, and the plumed headdress of the horse again occur on similar scenes from Carchemish. One feature, however, is unique on this type of relief and that is the helmet of the archer. This type is identifiable as Urartian, and is identical with the curious type of helmet with a crest closely fitting the head, shown on the heads of all the Urartian soldiers on the Balawat gates, who fought against Shalmaneser III in 857 B.C.[1] It is also the same type (as Dr. Barnett has shown in *Iraq*, XVI, 1, p. 7, note 3) as that worn by the Urartian bronze figure of a soldier now in the Louvre from Marash (*ibid*, Fig. 7, type 1), where it is distinguished from the other Urartian types, Barnett's type 2 and 3. Here, then, we have an Urartian soldier, presumably fighting for Sarduris II of Urartu some time early in the eight century B.C., when Zinjirli, along with Marash and Arpad, became part of the Urartian empire. The Balawat gates also show Urartian infantrymen armed with spears and round shields, and the shields with lions' heads are well portrayed in the relief from Khorsabad showing the temple of Musaṣir being sacked by Sargon in 714 B.C.

It is interesting to compare one relief from Carchemish[2] which stands apart from the usual series of fighting scenes, with the Zinjirli slabs. This is a hunting, not a battle scene with a wild boar in the place of the vanquished enemy. It is unfortunate that this relief is not well preserved; the archer has a tight fitting helmet and it is not possible to see whether it has a ridge crest like the Zinjirli archer, but a lion shield is shown behind the chariot. Now both the Zinjirli and Carchemish archers seem to belong to the distinct 'Armenoid' physical type, with long nose, high forehead and receding chin, and this type occurs in certain instances on the reliefs at Zinjirli.[3] It is also well known at Tell Halaf.

[1] King, *The Bronze Gates of Shalmaneser*, Pl. XXXVIII. Bossert, *Altanatolien*, 1209–10.
[2] Woolley and Barnett, *Excavations at Carchemish, III*, Pl. B.60, b.
[3] von Luschan, *op. cit.*, Pl. XXXVII.

For comparable helmets of the Zinjirli type outside Urartu, we must turn to Crete. Here in Tomb P at Fortetsa[4] were found fragments of a bronze belt where both the archers attacking the chariot and the central standing figure wear this same type of helmet with crest and close fitting cap; but to these helmets, as far as one can judge from the bad condition of the bronze, cheek pieces have been added. This is a feature not found on Urartian helmets as shown on the Balawat gates.

A more developed form, where the back of the helmet is extended downwards to cover the nape of the neck, is seen worn by the spearmen attacking a fortress on the silver bowl from Amathus[5] (in the British Museum) and also by the soldiers fighting on the silver bowl from the Bernardini tomb at Praeneste.[6] It is possible this is a Phoenician type of helmet whose origin can be traced back to the Urartians.[7] It is also important to note that in these two examples the crest is fixed directly to the helmet as in the Urartian type 1 (Balawat gates and Zinjirli), and is not a stilted crest attached to a central point sticking up above the head such as is found on certain Greek and Anatolian helmets. The importance of Anatolia in the development of the helmet in Greece has already been stressed by Miss Lorimer[8] and the Zinjirli relief serves to show the wide extent of Urartian influence, not only in Western Asia Minor but also in South-East Anatolia and North Syria whence, via Crete and the islands, it was transmitted to the west.

4 J. K. Brock, *Fortetsa*, Pls. 115, 168.
5 Myres in *J.H.S.* (1933), Pl. III.Cheek pieces are visible on three of the attacking soldiers and on one of the defenders.
6 Curtis, *The Bernardini tomb*, Memoirs of the American Academy in Rome, III, Pl. 18.
7 I owe this suggestion to Dr. Barnett.
8 *Homer and the Monuments*, p. 230 f.

A Glossary of Mosaic Motifs

By Mary M. C. Brennand

This glossary has been compiled in an attempt to standardise the terminology used in describing the different motifs making up the pattern of a mosaic pavement. In the past there has been confusion in the descriptive phrases used in excavation reports. If the same phrase were consistently used for the same motif, it would be possible to reconstruct the main elements of a mosaic even though the report were not illustrated.

In the introduction to his *Guide to the Greek, Etruscan, and Roman Paintings and Mosaics in the British Museum* (1933), Roger Hinks has classified some of the motifs found in the mosaics in that collection. Yet it still does not seem to be realised that these motifs have accepted names, and these are all too rarely used. Unless one phrase is rigidly confined to one motif there can only be misunderstanding, and to attempt to describe each mosaic individually is unnecessarily wordy and only adds to the confusion. How easily such confusion can arise is shown in Fig. 1, where all three motifs are based on the square; the use of these three different terms, each in itself an accurate description of the motif, saves further verbal differentiation.

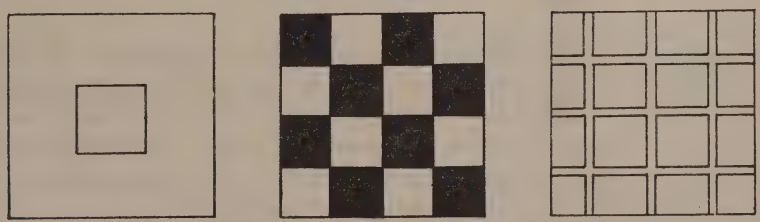


Fig. 1. Motifs based on the square

This list is not introducing new terms but repeating those that already exist and should be more widely used. It is based only on mosaics in Roman Britain, and it is far from complete; it covers rather the more common motifs found in this country. The terms used here are either those found in Hinks' classification, or, in listing motifs not dealt with by him, those recommended by Dr. David Smith.

In a brief list such as this only one example of each motif can be given. For some of the geometric motifs this is enough as they tend to be standardised and will be reproduced exactly time and time again. In other motifs the variations are practically endless, and this is particularly true of the bud and leaf motifs and the central floral motifs. Until a separate classification can be worked out for these, one phrase will have to cover all.

An explanation may be necessary of some of the terms chosen. 'Fret' can be applied to any pattern of straight lines joined at right angles. One of the simplest forms is given here, but the word can be used for other slight variations of this. 'Greek key' is merely one variety of the fret, but as the pattern is well known under that name it is easier to keep this as a separate category. The same is true of 'dentil'.

The distinction between 'diamond' and 'lozenge' may not seem entirely valid, but it is convenient. No further explanation is needed if 'diamond' is kept for a solid block of pattern of diamond shape, and 'lozenge' for the open diamond-shaped box (Fig. 2).

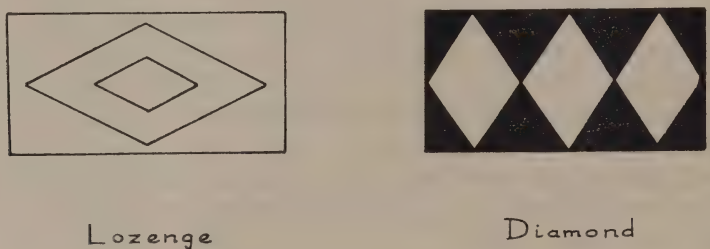


Fig. 2. Motifs based on the rhomboid

The grouping into border, filling and central motifs is not intended to be definitive. It is a useful classification, however, and it is roughly accurate. In some cases the position of the motifs is variable, and isolated motifs may be expanded to cover the whole floor.

No completely satisfactory verbal description of a mosaic pavement is possible. But the consistent use of certain recognised phrases at least for the main categories of mosaic motifs would make the written records clearer and more valuable.

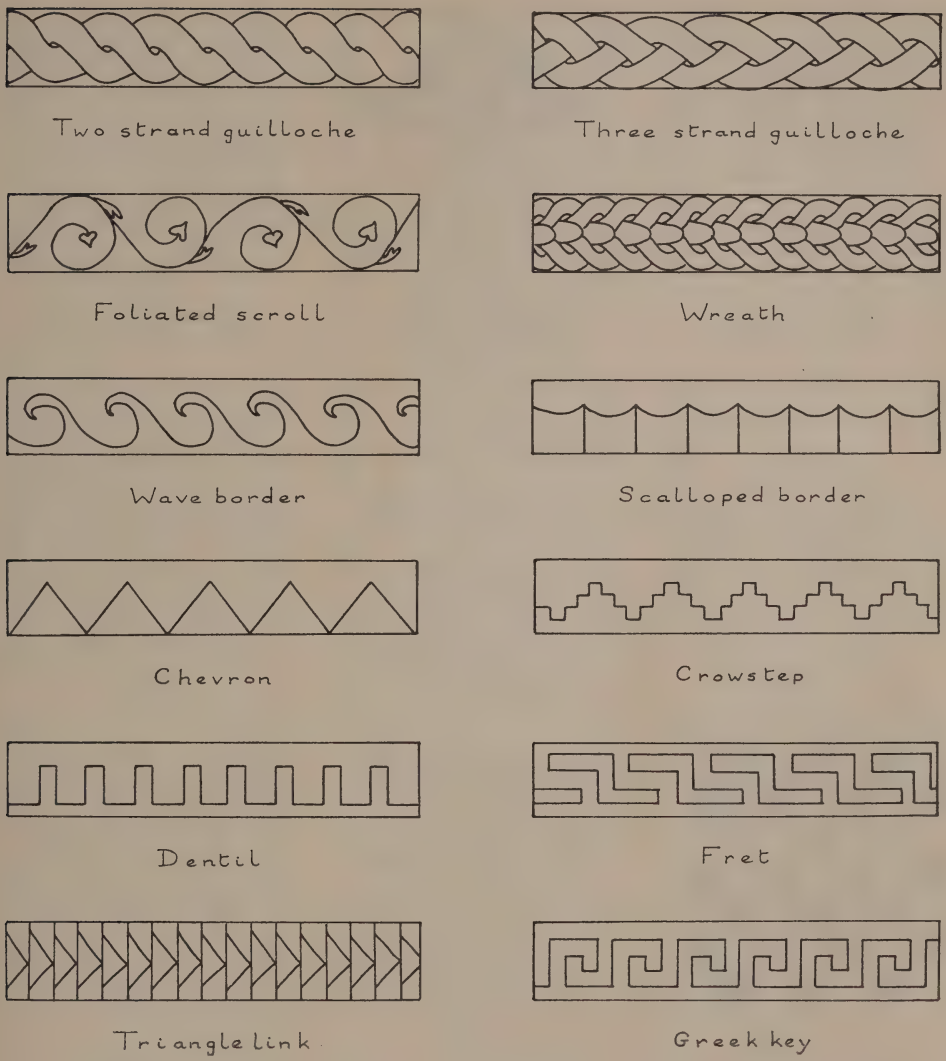
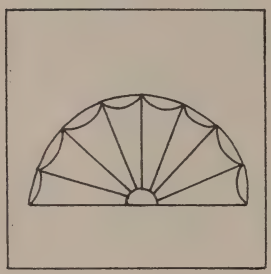


Fig. 3. Border motifs

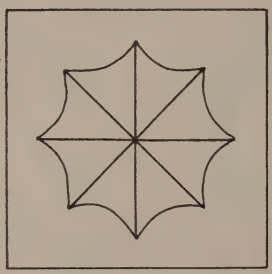
Cantharus

Floral motif

Running pelta

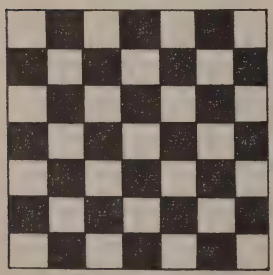


Scallop shell

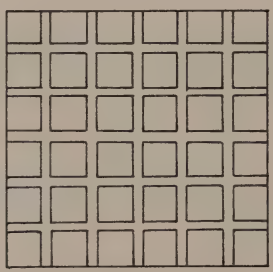


Umbrella motif

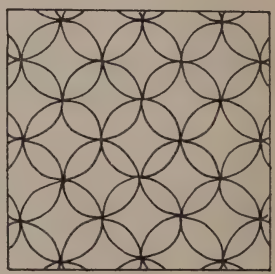
Scales



Chessboard



Lattice



Intersecting circles

Fig. 4. Central motifs

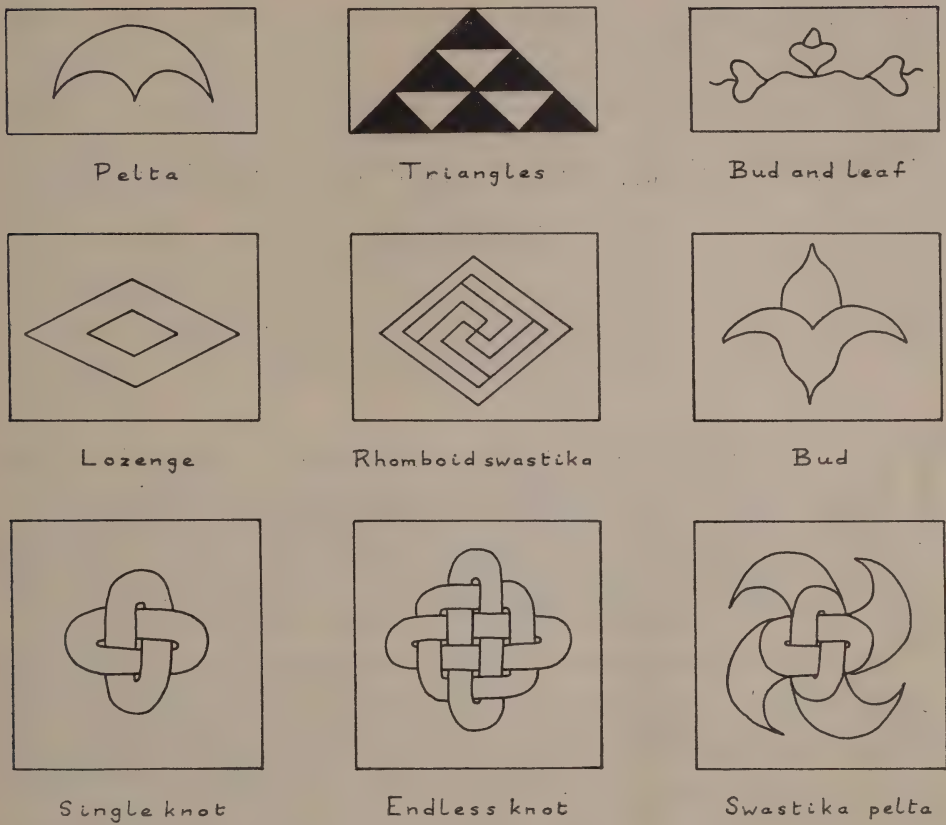


Fig. 5. Filling motifs

Report of the Director for the Session 1957-58

31-34 GORDON SQUARE

The outstanding event of the session was the removal of the Institute from St. John's Lodge to the new building in Gordon Square. The actual removal was completed early in March under the immediate direction of the Secretary: the operation was carried through with remarkable smoothness and with comparatively little disturbance of normal activities. Thanks are due to all who contributed to this effort, and not least to a number of students who rendered valuable help in both buildings.

Regret at leaving Regent's Park, the setting for more than twenty years of fruitful activity, has been softened for many by the knowledge that the new building provides space which is for the first time adequate for the Institute's needs and is equipped, as St. John's Lodge could not be, to provide for research and teaching in the techniques which are now indispensable to the modern archaeologist. The new position, moreover, presents opportunities for much closer contacts with other parts of the University, and not least with the Institute of Classical Studies, with which, as well as with the Examinations Department, the building is shared.

In the new building the Institute occupies five floors and part of a sixth, sharing with the Institute of Classical Studies the storage space in the basement. The ground floor is taken up with administrative offices, a large lecture room, the Drawing Department, and a vestibule which serves also for special exhibitions. The Library and a small lecture room occupy the first floor. The Western Asiatic Department, with the Palestinian collections, is on the second floor, the Environmental Department on the third, the Prehistoric European, Roman, and Photographic Departments on the fourth, and the Technical Department on the sixth floor. A feature of the plans is a number of research rooms on most floors which are available for allocation to research students, a necessary provision in view of the amount of material that is frequently involved in archaeological research. In addition, the storage basement, seminar rooms, and many of the other rooms in which collections are handled are equipped with standard storage

fittings on a new pattern, which provide for the flexible and economical handling of teaching and research material. Besides storage accommodation, the basement also contains a workshop and demonstration rooms, cloakrooms and a common room. The ground floor exhibition space is provided with interchangeable fittings and is intended for small special exhibitions dealing with subjects directly related to the Institute's work. The first exhibition, prepared for the Chancellor's opening, illustrated the work of the Departments.

The building was officially opened by the Chancellor of the University, Queen Elizabeth the Queen Mother, on April 29th. The Chancellor was welcomed by Dr. J. F. Lockwood, the Vice-Chancellor: his speech and Her Majesty's reply are to be printed in the Annual Report of the Institute of Classical Studies. Professor S. W. Wooldridge, Chairman of the Committee of Management of this Institute, expressed thanks to Her Majesty.

GORDON CHILDE BEQUEST AND MEMORIAL

As recorded in the last Annual Report Professor Childe died in tragic circumstances in Australia on October 19th 1957. In his will Professor Childe bequeathed his estate to the Institute, subject to a life interest, "to be used for the purposes of the Institute by the Management Committee". (Professor Childe had already presented the more important part of his library to the Institute, as recorded last year.) A final decision as to the use to which the Bequest shall be put has been postponed pending the winding-up of the estate.

At the request of Professor J. G. D. Clark, himself a member of the Committee of Management, the Committee appointed a small consultative committee to help him in his work as Professor Childe's literary executor.

In response to a number of suggestions a memorial fund has been launched and an appeal is now being circulated.

ADMINISTRATION

Staff

Dr. John Waechter was appointed Lecturer (part-time) in Palaeolithic Archaeology as from the beginning of the present Session.

Professor T. Sulimirski, Hon. F.S.A., has for many years given the Institute valuable help in many matters to do with the archaeology of Eastern Europe and has frequently lectured in the Prehistoric Department. In recognition of these services, past and present, the Committee of Management has awarded Professor Sulimirski the title of Special Lecturer in the Archaeology of Eastern Europe.

The thanks of the Institute are due to Mr. F. R. Hodson, B.A., who as Visiting Lecturer has assisted Professor Evans in the Prehistoric European Department, and

Mr. Frere in the Department of the Archaeology of the Roman Provinces by providing teaching in the prehistoric European Iron Age.

On the invitation of the Czechoslovakian Academy of Sciences Professor Zeuner visited the Mousterian site of Gánovce in Slovakia, where a Neanderthal skull had been found, in order to study and comment on the work done on the chronology of the site. He also took the place of the Director (who was unable to attend) as representative of the University at the Fifth International Congress for Prehistoric and Protohistoric Sciences held at Hamburg during August.

Mr. Frere attended the Seventh International Congress of Classical Archaeology in Rome and Naples during September, and with Mr. Cookson's help exhibited the Institute's coloured film demonstrating the restoration of Roman wall plaster.

Mrs. Maxwell-Hyslop attended by invitation the International Symposium on 'Recent Contributions of Medical Biology to Ethnology, with special reference to the origin of the Etruscans', organised by the C.I.B.A. Foundation in London in April.

Dr. K. M. Kenyon was appointed Ethel M. Wood Lecturer in the University for 1958.

Amongst the administrative staff, Miss E. Atkins resigned her position as clerk in December and her place was taken by Miss G. Kemp. Messrs. W. McDonald and N. W. Carey were appointed porters at the new building.

Lectures

Dislocation caused by preparations for the impending removal to Gordon Square made it impossible to arrange the usual courses of public lectures at St. John's Lodge during the early part of the session. Once again, however, advantage was taken of the presence of visiting scholars, who consented, sometimes at short notice, to lecture on their special subjects. Mr. James Mellaart of the British Institute of Archaeology at Ankara, lectured on 'The Neolithic of Anatolia and Neighbouring Countries' in February; Dr. L. S. B. Leakey, of the Coryndon Museum, Nairobi, lectured on 'Olduvai Gorge' in June; and Dr. J. D. Clark, of the Rhodes-Livingstone Museum, Rhodesia, on 'The Prehistoric Site of Kalambo Falls, N. Rhodesia and Associated Industries', in July. Attendances averaged 56. In addition, the Reverend Pére R. de Vaux, O.P., of the École Biblique et Archéologique Française, Jerusalem, gave a course of three Special University Lectures under the general title of 'Recent Excavations in Palestine' in April–May. Attendances at Pére de Vaux's lectures averaged 142.

The collaboration with the Extra-Mural Department of the University in the teaching of archaeology for the Extra-Mural Diploma (referred to in the last Report) was continued. Though fewer calls were made on the Institute's slide-collections as the Department built up its own teaching series, use was made of the Institute's teaching collections for demonstration purposes. The Ministry of Education teachers' course in archaeology in the teaching of history also once again relied on the Institute's material before transferring to Verulamium.

The Council for British Archaeology, of which the Director is President, held its Annual Meeting in the Institute in July, when the members were given the opportunity of inspecting the new building.

Students

The total number of students registered at the Institute during the Session was 71; besides these, 35 Intercollegiate students attended courses. Of those registered at the Institute, 20 were registered for Diplomas, 22 for Higher Degrees, three for special research under Statute 21(iii) part-time, and six as full-time Technical Students, while 17 Occasional Students have been attending lectures and using the facilities of the Institute, and three students have attended Diploma courses as full-time Occasional Students.

One student was awarded the Diploma in European Archaeology A, three students the Diploma in European Archaeology, Section B.I, one student the Diploma in Prehistoric Archaeology; and one student the Diploma in Indian Archaeology.

Of the 22 students registered for Higher Degrees, nine were registered for the Ph.D. full-time and four part-time, two for the M.A. full-time and six part-time, and one for the M.Sc. full-time. Of the foregoing, four students were awarded the Ph.D. Degree: Mr. N. Ahmed of Pakistan, with a grant from the Pakistan Government, for his thesis on 'The History and Archaeology of Taxila'; Mr. J. J. Butler of America for his thesis on 'Relations between the British Isles and Northern Europe during the Bronze Age'; Miss V. Katrak of Pakistan for her thesis on 'Analysis of Achaemenian Art and Architecture with reference to origins, influences and development'; and Miss V. Seton-Williams of Australia for her thesis on 'An archaeological examination of the Material from the Syrian Sites of the second Millennium 1800–1300 B.C.' One student from Thailand, with a grant from the Thai Government, Mr. Vidya Intakosai, was studying for the Diploma in Prehistoric Archaeology.

The following countries were represented among students registered at the Institute: Australia three, Ceylon two, Colombia one, India one, Nigeria one, Pakistan three, Portugal one, South Africa one, Thailand two, U.S.A. four.

Collections

Professor Mallowan has added a selection of material from his excavations at Nimrud to the teaching collections of the Western Asiatic Department.

Professor Evans has presented a series of Neolithic and Minoan sherds from Crete.

TEACHING AND RESEARCH

THE Director continued his work in the bombed areas of the City of London, where the Roman and Mediaeval London Excavation Council is investigating the north-western defences of the Roman city. He also resumed his study of French beakers and of the megalithic tombs of Wales. He has also lectured extensively in London and elsewhere.

Publications

'Archaeology and the University', *Inst. of Arch. Bulletin*, 1955–56, pp. 37–48.
Capel Garmon Chambered Long Cairn, Denbighshire (Ministry of Works), pp. 1–10.
Various reviews.

ENVIRONMENTAL ARCHAEOLOGY

The number of students working in the Department during the year was eleven, five being registered for the Ph.D., two for the M.A., one for the M.Sc., one as a Research student under Statute 21(iii), and two for the Postgraduate Diploma in Prehistoric Archaeology. Miss J. Sheldon, Technical Assistant in the Department, was successful at the Diploma examination in June. Of the Higher Degree students, four were registered in the Faculty of Arts and four in the Faculty of Science. The following is a list of the subjects on which these students worked during the Session:—

Ph.D.

R. W. Andrews (Faculty of Science (*part-time*)): British varved clays.
J. Philips (Miss) (Faculty of Arts (*part-time*)): Indian Lower Palaeolithic.
D. Vaughan (Faculty of Science): Radiocarbon dating.
G. W. P. Jarvis (Faculty of Arts (*part-time*)): Sites in the Lea Valley.
J. Clutton-Brock (Miss) (Faculty of Science): Faunas from prehistoric sites.

M.A.

E. Coult (Mrs.) (Faculty of Arts (*part-time*)): North African Stone Age.
S. Pearce (Miss) (Faculty of Arts): Iron in prehistoric Africa.

M.Sc.

A. Rosenfeld (Miss) (Faculty of Science): Archaeological deposits of Torbryan Caves.

Statute 21(iii)

A. C. Western (Miss) (*part-time*): Identification of wood from archaeological deposits.

In addition, research was carried out in the Department by Professor Zeuner on the Pleistocene chronology of the Canary Islands; Bed III of the prehistoric site of Olduvai, Tanganyika; the Palaeolithic of Jordan, especially the site of Azraq; the Adlun Cave, Lebanon; the C14 dating and fauna of Jericho. Dr. Waechter continued work on the Upper Palaeolithic sequence at Ksar 'Akil, Lebanon. Miss Sheldon worked on soil samples from the Neolithic site of Windmill Hill, Wilts.

In connexion with the above research the Professor carried out field work in Jordan and the Lebanon, and in the Canary Islands, the last at the invitation of the Spanish Research Council, who invited him to continue his investigations on the prehistory of the Guanche in 1958–59.

Excavations were continued at Three Holes Caves, Torbryan, Devon, and the Palaeolithic layer exposed. Samples were collected for investigation in the laboratory.

Apart from sites studied specifically in the interests of teaching and research work, ten requests to study soils, the nature of archaeological material and bones were complied with during the year, involving over 250 samples and bones. They came from the following sites: Mardley Heath, Herts. (Boulder clay); Brean Down, Somerset (Pleistocene to Bronze Age); Freshwater West, Pembrokeshire (Mesolithic); Nutbane long barrow, Hants (Neolithic); Fussells Farm long barrow, Wilts. (Neolithic); Snail Down, Everleigh, Wilts. (Bronze Age); Caesar's Camp, Keston, Kent (Iron Age); Knowle Hill, Dorset (Iron Age). This work was carried out mainly by Dr. Cornwall, or under his direction.

Members of the Department gave a number of outside lectures during the Session; these included two sessional courses of Extra-Mural lectures given by Professor Zeuner, and two first-year courses for the Extra-Mural Diploma in Archaeology given by Dr. Waechter.

Publications

By Professor Zeuner:

Geochronologia. 524 pp., 27 pls. (Barcelona).

Dating the Past. 4th edit., 516 pp., 27 pls. (London).

'Cat and Dog in the Neolithic of Jericho', *Palestine Expl. Quart.*, Jan.–June 1958, pp. 52–55.

INDIAN ARCHAEOLOGY

There were two students registered for the Diploma, one of whom, Mr. R. da Silva, of Ceylon, took the examination at the end of the year and successfully gained his Diploma. One student was registered for the Ph.D. as follows:—

Ph.D.

N. Ahmed (Faculty of Arts): the Antiquity of Taxila.

Mr. Ahmed was awarded the Ph.D. Degree for his thesis, and has now returned to take up his appointment as Curator of the National Museum, Karachi.

The visits to the Oriental and national museums have been well supported, and expeditions were made to Westminster Hall, Westminster Abbey, Norman London, and Bignor, Sussex.

PREHISTORIC EUROPEAN ARCHAEOLOGY

There were six students registered for the Diploma, four of whom were full-time and two part-time. One of the part-time students, Miss S. Mann, took the examination

at the end of the year, and successfully gained her Diploma. There was also one full-time occasional student in the Department, and teaching was provided for twenty-three intercollegiate students. Three students were registered for the Ph.D. and one for the M.A., as follows:—

Ph.D.

D. Britton (Faculty of Arts): Some aspects of the metal industry in Prehistoric Europe, especially in Britain.
J. J. Butler (Faculty of Arts): Relations between the British Isles and Northern Europe during the Bronze Age.
R. R. Mackay (Faculty of Arts) (*part-time*): Domestic sites of the Bronze Age in Britain.

M.A.

A. Mole (Faculty of Arts (*part-time*)): Prehistoric European Archaeology.

Of these Mr. J. J. Butler submitted his thesis at the end of the year, and was subsequently awarded the Ph.D. Degree.

The Department held two field-meetings during the third Term in conjunction with the Department of the Archaeology of the Roman Provinces. The first of these was a single-day excursion; the second lasted four days, during which various sites in Norfolk and Suffolk were visited, and students were present at the experimental firing of pottery in a Roman kiln.

During the third Term the Professor was granted leave of absence until June 23rd in order to conduct an excavation in the Neolithic levels below the palace at Knossos, Crete.

Publications

By Professor Evans:
'Two Phases of Prehistoric Settlement in the Western Mediterranean', *Inst. of Arch. Bulletin*, 1955–56, pp. 49–70.
'The Neolithic Revolution and the Foundation of Cities', Ch. 2 of Hutchinson's *Concise Encyclopedia of World History*, pp. 24–47.

ARCHAEOLOGY OF THE ROMAN PROVINCES

There were six students registered for the Diploma, four full-time and two part-time; of these three candidates, Mr. A. G. Davies, Miss C. Phillips, and Mrs. L. M. Burn (a part-time student) passed the Diploma examination. In addition ten intercollegiate students attended the Roman Britain course. Two students were registered for the Ph.D. Degree and three for the M.A., as follows:—

Ph.D.

S. Chadwick (Miss) (Faculty of Arts): The Jutish cemetery at Bifrons, Kent.
M. Rennie (Miss) (Faculty of Arts): Roman pottery of the Severn basin.

M.A.

J. Alcock (Miss) (Faculty of Arts (*part-time*)): Romano-British religion.
M. Brennand (Miss) (Faculty of Arts): Mosaic pavements in Britain.
H. F. Cleere (Faculty of Arts (*part-time*)): Romano-British iron.

Miss C. Phillips, a student in the Department, won a postgraduate research studentship in Archaeology at Durham University.

Work is proceeding with the drawing and consideration of the Canterbury pottery (Miss Wilson) and the Verulamium pottery (Mrs. Birmingham), and the Verulamium wall plaster (Mr. and Mrs. Petty and Mrs. Hope Simpson). Miss Brocklebank has made considerable progress with the card index of Romano-British finds.

In December 1957 Mr. Frere spent a week in the field on Roman military remains in South Wales with Professor Richmond and Dr. St. Joseph. He also conducted excavations at Bignor Villa, Sussex, in April, and at Verulamium in July and August, and acted as consultant for the excavation conducted by Mrs. Bennett at the Romano-Celtic Temple near Bruton in June.

A number of lectures, mainly on Roman Britain or Verulamium, was given in the country, including a sessional course for the Extra-Mural Department.

Publications

By Mr. Frere:
Editor, *Surrey Archaeological Collections*, Vol. LV.
'3rd Interim Report on Verulamium', *Antiq. Journ.* XXXVIII, pp. 1–14.
'Lifting Mosaics', *Antiquity* XXXII, pp. 116–19.
Various reviews.

WESTERN ASIATIC ARCHAEOLOGY

Within the Department there was one student registered for the Diploma in Western Asiatic Archaeology (Mesopotamia), and two for the Diploma in Western Asiatic Archaeology (Palestine); there were two students registered for the Ph.D. Degree, and one for the M.A., as follows:—

Ph.D.

V. Katrak (Miss) (Faculty of Arts): Achaemenian Art and Architecture.
V. Seton-Williams (Miss) (Faculty of Arts): Material from Syrian sites of the second millennium, 1800–1300 B.C.

M.A.

J. Birmingham (Mrs.) (Faculty of Arts): Archaeology of Cyprus from 1200–600 B.C.

Of these Miss Katrak and Miss Seton-Williams each presented her thesis and was awarded the Ph.D. Degree.

A class of ten students attended the special course in Anatolian Archaeology, and a larger class attended a seminar on the Foundations of Civilisation in Western Asia.

The Department continued its research activities. Professor Mallowan spent six weeks in Iraq and continued the excavations at Nimrud. Dr. Kenyon spent five months in Jordan to direct the excavations at Jericho. The excavations have now been concluded with the establishment of the sequence of cultures down to a mesolithic phase on bed-rock. Mrs. Maxwell-Hyslop has been engaged in an investigation of the relationship of Etruscan metallurgy with that of the Orient in the 8th–7th centuries with special reference to the decorated silver bowls.

Professor Mallowan gave a number of public lectures in this country and in Paris and Baghdad.

Publications

By Professor Mallowan:
Edited *Iraq*, vols. XIX–XX.
'Excavations at Nimrud', *Iraq* XIX, XX.
By Dr. Kenyon:
Digging up Jericho. 267 pp. (Benn, London).
'Excavations at Jericho, 1957', *Palestine Exploration Quarterly* (July–December 1957).
'Some Notes on the early and middle Bronze Age strata of Megiddo', *Evetz Israel* V.
(with J. W. and G. M. Crowfoot):
Samaria–Sebaste, III, 478 pp. Palestine Exploration Fund.

DRAWING AND SURVEYING DEPARTMENT

Owing to the amount of internal work, both the instruction to students in drawing and surveying and the execution of work for the various Departments, it has been found increasingly necessary to curtail the services which the Drawing Department has hitherto offered to Members of the Institute. This is the more regretted as contributions by Members of drawings done for them by the Department were much appreciated in the exhibition held to mark the opening of the new building.

PHOTOGRAPHIC DEPARTMENT

The Department now occupies a spacious, well-equipped studio and darkrooms on the fourth floor of the new building. The studio was carefully planned to meet teaching requirements and its general efficiency was immediately demonstrated by the facts that teaching was recommenced within two days of the removal and that other demands were promptly met, including particularly a large quantity of photographic enlargements and other work for the exhibition illustrating the Institute's work which was prepared for the official opening. The studio has already received many visits of inspection from archaeologists, museum experts, and photographic experts.

During the session students visited the School of Graphic Arts, Kodak Ltd., and Ealing Technical College.

Mr. M. B. Cookson was given leave of absence to carry out the photographic work for the excavations at Verulamium, under Mr. Frere. The Department was also responsible for the photography at four smaller excavations. The colour film on the restoration of the mosaic pavement was completed, and a new one on the excavation of timber buildings started.

The Head of the Department gave twelve outside lectures to various associations, and lectured at three Extra-Mural field centres.

The following additional equipment was purchased for student use:—

1. A printing box with 12″ × 15″ working surface.
2. A new camera tripod in metal.
3. A further small camera.

TECHNICAL DEPARTMENT

The benefits to be derived from the new siting of the Institute quickly became apparent in the Technical Department which has gained particularly by closer proximity to the British Museum. Mr. Hodges has been able to maintain close contact with the Museum's research laboratory, and has in consequence been able to gain fresh insight into recent advances in conservation methods, which, wherever practicable, have been incorporated in the Department's teaching. Thanks are due to Dr. H. J. Plenderleith, Dr. Werner and Mr. Organ, of the laboratory, for unfailing kindness and help throughout the years.

The quarters of the Department on the sixth floor of the new building comprise a chemical laboratory, chiefly for the treatment of metal objects, a spacious plaster laboratory, a smaller laboratory for the use of advanced students, an office for the staff and an external store for inflammable solvents. The impregnating chamber has been overhauled by the makers and is now re-housed in a special room in the Department. The opportunity of the move was also taken to examine, refurbish or where necessary discard existing equipment, and a special University grant has been used to re-equip, and particularly to provide much-needed new items.

The new technology workshop in the basement is now equipped with a kiln for pot-firing. The potter's wheel was brought into working order, and demonstrations of simple metal-working were also given. The X-ray machine, installed separately, also in the basement, was overhauled and Mr. Rees-Jones, of the Courtauld Institute of Art, kindly advised as to its use. In this connection, the courses in archaeological technology, which often have a direct bearing on methods of conservation, were taken over by the Department.

The Department is also grateful to Mr. Rees-Jones for his instructions to technical students in the care and preservation of pictures.

Twenty-two students worked in the Department, seven of them full-time students following the Technical course.

In addition to normal teaching, a special course of instruction was given to Mr. Joseph Shenhav of the Israeli National Museum, while Mr. Abbott of Leicester Museum, a former student, visited the Department for a short refresher course.

Work was carried out for the Museums at Alton (Curtis), Lewes, Plymouth, Winchester and Brading Villa, and for expeditions which had been excavating at Verulamium, Canterbury, and Nimrud; but, owing to the increasing amount of teaching necessary in the Department, a rule has had to be made that only such work shall be undertaken as is of definitely instructive value. Over a hundred iron objects from the Roman villa at Brading, Isle of Wight, were treated by students, and nearly five hundred objects of all kinds were treated during the Session.

One of the more interesting problems tackled was the reconstruction for Professor Mallowan of a large storage jar from Nimrud, and the subsequent measurement of its cubic capacity—the aim being to relate this volume to a cuneiform inscription stating its capacity in terms of the *homer* on the side of the jar.

Three new dioramas have been completed by Miss Howard under the direction of Professor Zeuner: Dolni Vestonice, Moravia (Last Glaciation, Aurignacian); Les Eyzies, France (Last Glaciation, Aurignacian and Magdalenian); Star Carr, England (Early Postglacial, Mesolithic). Miss Howard also continued to work on models of prehistoric animals and made a number of drawings of carved ivory panels from Nimrud.

THE LIBRARY

The Library remained available to students throughout the year and was only closed for an additional fortnight while the actual move to the new premises was taking place. The new quarters comprise an ante-room which contains the catalogues, lantern slides and maps, a central stack for the bulk of the books, and a reading room to seat 24, in addition to offices for the Librarian and Assistant Librarian.

During the year, the Library benefited from the large bequest of books and periodicals belonging to the late Professor Childe, and numerous offprints which it will take some time to incorporate into the Library. A small collection of books and pamphlets was also bequeathed by the late Dr. J. W. Hildburgh. From the library of the late S. Hazzledine Warren, runs of the Geological Society's publications, and of *Man* and the *Journal* of the Royal Anthropological Institute have filled extensive gaps among the Library's periodicals. A large number of very useful offprints was also given to the Library by Sir Leonard Woolley and Sir Mortimer Wheeler.

Figures for library services remain fairly constant and the influence of the proximity of other University institutions is not yet apparent.

The following is a summary of additions made during the year:—

Books	550	*Pamphlets*	447
Purchased	127	Purchased	28
Presented	391	Presented	396
Exchanged	32	Exchanged	23
Periodicals	635	*Lantern slides*	998

174 volumes were bound.

Volumes lent totalled 2,691, the highest month being October (370), the lowest August (85). 27 works were borrowed from outside Libraries and 14 lent. 4,207 lantern slides were lent.

The following have presented books, periodicals and pamphlets:—
Dr. B. Allchin; Dr. F. R. Allchin; E. G. Anati; Society of Antiquaries of London; Dr. A. J. Arkell; P. Ashbee; Aslib; H. C. Bowen; Dr. R. Braidwood; Abbé H. Breuil; British Archaeological Association; R. Carrington; Miss S. Chadwick; CIBA Review; Dr. J. D. Clark; Professor K. de B. Codrington; J. Corbel; Dr. I. W. Cornwall; Mrs. Cotton; J. D. Cowen; F. Engel; Per Fett; French Embassy, Cultural Division; S. S. Frere; Miss I. Gedye; Dr. H. Godwin; Goldsmiths' Librarian, University of London; R. D. Greenaway; E. A. M. Greiss; L. V. Grinsell; Dr. D. B. Harden; A. T. Hatto; Professor C. F. C. Hawkes; H. Helbaek; H. W. M. Hodges; Institute of Classical Studies; Istanbul Archaeological Museum; Dr. K. M. Kenyon; J. M. Lewis; Prince John Loewenstein; J. L. Lorenzo; S. C. Malik; Nicholson Museum, Sydney; Dr. K. Oakley; Oslo University; Peabody Museum; Pennsylvania University Museum; Miss J. Philips; Miss D. Rennie; Miss M. Rowlatt; T. F. Ryana; A. Sanchez Paredes; Sayans Castanas; Science Museum Library; C. E. Stevens; Professor T. Sulimirski; R. Summers; Miss G. C. Talbot; Miss J. du Plat Taylor; Trustees of the Wellcome Foundation; Mrs. J. W. Western; Sir Mortimer Wheeler; Sir Leonard Woolley.

Publications

By Miss J. du Plat Taylor:
Myrtou-Pigadhes, a Late Bronze Age Sanctuary in Cyprus, 117 pp. Ashmolean Museum, Oxford.

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